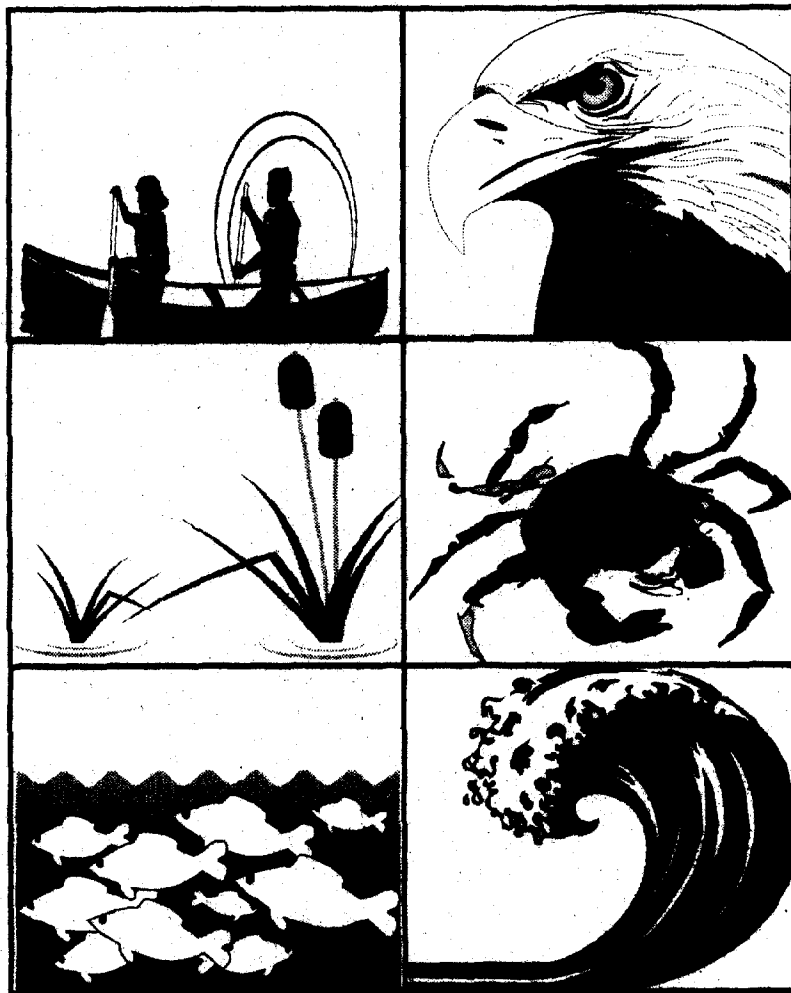


# Virginia Coastal Program Projects Catalogue



**Issue I**  
**March 1998**

# Virginia Coastal Program Projects Catalogue

Issue I  
March 1998

This catalogue is published by the Virginia Coastal Resources Management Program of the Virginia Department of Environmental Quality.

Thank you to all of our all partners and to all grantees of the Program who have provided text and materials for this catalogue.

This catalogue was developed for all agencies, organizations, and individuals interested in coastal resource management issues and activities. We hope that in sharing coastal project information and results, this catalogue will contribute to furthering coordination among Virginia's coastal resources managers and enhance the education of the Virginia's citizens.

This catalogue was 100% funded by the Virginia Coastal Resources Management Program of the Department of Environmental Quality through Grant # NA57OZ0561-01, NA67OZ0360 and NA77OZ0204 of the National Oceanic and Atmospheric Administration, Office of Ocean and Coastal Resource Management, under the Coastal Zone Management Act of 1972, as amended.

The views expressed herein are those of the authors and do not necessarily reflect the views of NOAA or any of its subagencies.














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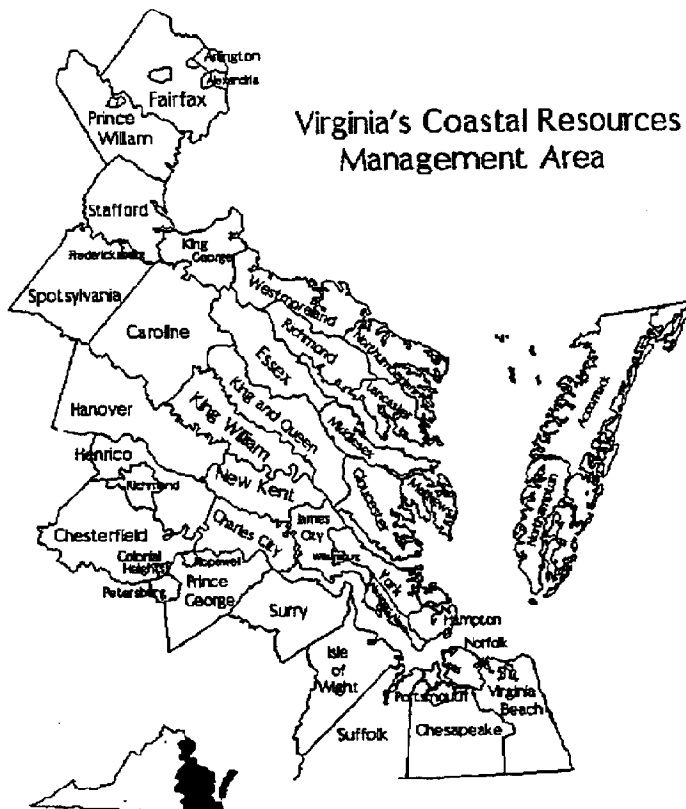
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**SPECIAL NOTE:** All VIMS phone numbers have been converted to a new exchange - 684 (former exchange was 642). Please use the new VIMS phone numbers given in the project lists. The old exchange is used in the body of the catalogue.

## VIRGINIA'S COASTAL ENVIRONMENT

Virginia's "coastal zone" encompasses 44 Tidewater counties and cities and all of the waters therein, and out to, the three mile Territorial Sea boundary. This area includes all of Virginia's Atlantic coast watershed as well as parts of the Chesapeake Bay and Albemarle- Pamlico Sound watersheds. Although only 29 percent of Virginia's land area lies within our coastal zone (Tidewater Virginia), this area is called home by more than 60 percent of the Commonwealth's population. The Virginia shoreline is approximately 5,000 miles in length and includes the four tidal rivers of Virginia (the Potomac, Rappahannock, York, and James), the Chesapeake Bay, into which they drain, and the Atlantic Ocean coastline.

Virginia's coastal area is diverse and extensive, with oceanfront shoreline, estuaries, and tidal rivers, which reach as far as 100 miles inland. Within this area, both natural and cultural features range widely from the wild, undeveloped beaches of the barrier islands to the "hard" shoreline of Hampton Roads' port facilities.



### Towns within Tidewater Counties

Ashland	Nassawadox
Belle Haven	Occoquan
Bloxom	Onancock
Bowling Green	Onley
Cape Charles	Painter
Cheriton	Parksley
Claremont	Port Royal
Clifton	Quantico
Colonial Beach	Saxis
Dumfries	Smithfield
Eastville	Surry
Exmore	Tangier
Hallwood	Tappahannock
Haymarket	Urbanna
Herndon	Vienna
Irvington	Warsaw
Kilmarnock	West Point
Melfa	White Stone
Montross	Windsor



## **VIRGINIA COASTAL RESOURCES MANAGEMENT PROGRAM**

The Virginia Coastal Resources Management Program, commonly known as the Virginia Coastal Program, was established in 1986 as a network of existing state laws and policies through which the Commonwealth manages sand dunes, wetlands, underwater lands, fisheries, point and nonpoint source water pollution, air pollution, shoreline sanitation and a variety of other areas of particular concern, including coastal wildlife habitats, coastal public access, waterfront redevelopment, and underwater historic sites.

These laws and policies are administered by:

*Virginia Marine Resources Commission (VMRC)*

Ocean and bay Fisheries Management, Subaqueous Lands Management, Dunes Management, and Wetlands Management (Dunes and wetlands permitting is carried out by local governments which have adopted dunes and wetlands model ordinances.)

*Virginia Department of Environmental Quality (DEQ)*

Point Source Water Pollution Control, Air Pollution Control

*Virginia Department of Game and Inland Fisheries (DGIF)*

Inland Fisheries Management

*Virginia Department of Conservation and Recreation (DCR)*

Nonpoint Source Pollution Control (Erosion and sediment control permitting is carried out by local governments.)

*Virginia Department of Health (VDH)*

Shoreline Sanitation

*Geographic Areas of Particular Concern*

wetlands, spawning/nursery/feeding grounds, coastal primary sand dunes, barrier islands, significant wildlife habitat areas, significant public recreation areas, significant sand and gravel resource deposits, underwater historic resources, highly erodible/high hazard areas, waterfront redevelopment areas

The Department of Environmental Quality (DEQ) serves as lead agency for Virginia's networked Coastal Program and helps agencies and localities to develop and implement coordinated coastal policies.

Having a federally approved Coastal Program also authorizes Virginia to require that federal actions in its coastal zone are consistent with the state's Coastal Program.

Together, Virginia's localities, state agencies and the National Oceanic and Atmospheric Administration (NOAA), Office of Coastal Resource Management form an effective partnership.

Other agencies participating in the Program include the Virginia Department of Historic Resources (DHR), the Chesapeake Bay Local Assistance Department (CBLAD), the Virginia Department of Forestry (DOF), the Virginia Institute of Marine Science (VIMS), and the Virginia Department of Agriculture and Consumer Services (VDACS).

As stated in Executive Order Number Twenty-Four (94), signed by Governor Allen in June 1994, the goals of Virginia's Coastal Resources Management Program include: the prevention of environmental pollution and protection of public health; the prevention of damage to the Commonwealth's natural resource base; the protection of public and private investment in the Coastal Zone; the promotion of resources development and public recreation opportunities; and the provision of technical assistance and information.

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## **NETWORK AGENCY WEB SITES**

Virginia Coastal Program

*[www.deq.state.va.us/envprog/coastal.html](http://www.deq.state.va.us/envprog/coastal.html)*

Department of Environmental Quality

*[www.deq.state.va.us](http://www.deq.state.va.us)*

Virginia Marine Resources Commission

*[www.state.va.us/mrc/homepage.htm](http://www.state.va.us/mrc/homepage.htm)*

Department of Game and Inland Fisheries

*[www.state.va.us/~dgif/index.htm](http://www.state.va.us/~dgif/index.htm)*

Department of Conservation and Recreation

*[www.state.va.us/~dcr/dcr\\_home.htm](http://www.state.va.us/~dcr/dcr_home.htm)*

Department of Health

*[www.vdh.state.va.us](http://www.vdh.state.va.us)*

Department of Historic Resources

*[www.deq.state.va.us/dhr/dhrwebpg.htm](http://www.deq.state.va.us/dhr/dhrwebpg.htm)*

Chesapeake Bay Local Assistance Department

*[www.state.va.us/cblad/homepage.htm](http://www.state.va.us/cblad/homepage.htm)*

Department of Forestry

*[www.state.us/~dof/dof.htm](http://www.state.us/~dof/dof.htm)*

Virginia Institute of Marine Science

*[www.vims.edu](http://www.vims.edu)*

Department of Agriculture and Consumer Services

*[www.state.va.us/~vdacs/vdacs.htm](http://www.state.va.us/~vdacs/vdacs.htm)*

## **FEDERAL PARTNER WEBSITES**

Office of Ocean and Coastal Resources Management, NOAA

*[www.nos.noaa.gov/ocrm/](http://www.nos.noaa.gov/ocrm/)*

Chesapeake Bay Office, NOAA

*[155.206.19.100/ncbohhome.htm](http://155.206.19.100/ncbohhome.htm)*

Chesapeake Bay Commission

*[www2.ari.net/cbc/cbc.htm](http://www2.ari.net/cbc/cbc.htm)*

Chesapeake Bay Program (EPA)

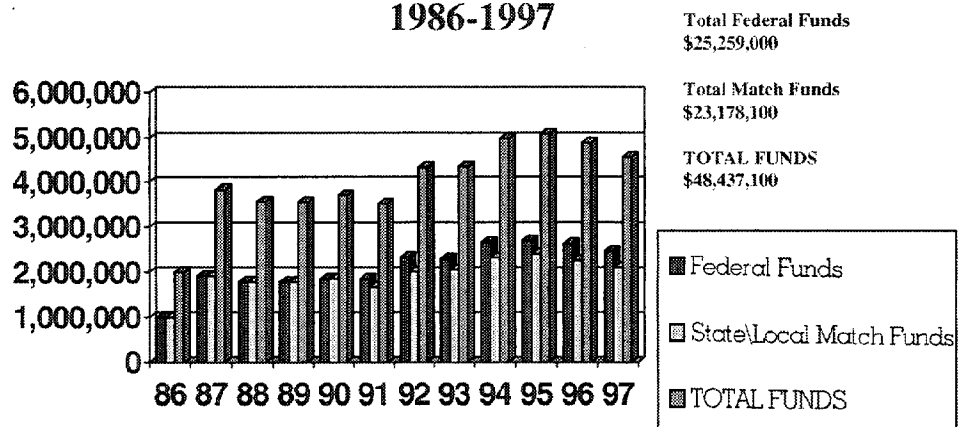
*[chesapeakebay.net/bayprogram](http://chesapeakebay.net/bayprogram)*

## VIRGINIA COASTAL PROGRAM FUNDING

Virginia receives more than \$2 million annually in federal funds through NOAA's Office of Ocean and Coastal Resource Management under the Coastal Zone Management Act (CZMA) of 1972, as amended. These dollars are equally matched by Virginia's state agencies and local governments.

Virginia has received financial assistance grants under Sections 306, 306A, 308, 309, and 6217 of the CZMA. These funds provide Virginia with the means to carry out its goals of effective protection and careful development of its coastal areas. Section 306 allows funding for the implementation of Virginia's Coastal Program, while Section 306A allows funding for the acquisition of fee simple and other interests in land or low-cost construction projects, i.e. to preserve important natural areas and improve or provide public access through acquisition and/or construction. Section 308 allows funding for projects which are regional in scope including interstate projects; demonstration projects that have the potential for improving coastal management, especially at the local level; emergency grants to address unforeseen or disaster related circumstances; and projects to investigate and apply the public trust doctrine. Section 309 allows match-free funding for coastal zone enhancement projects which create new enforceable policies in any of nine identified areas. Section 6217 allows funding for development of state coastal nonpoint source pollution programs. (Note: not all sections of the Coastal Zone Management Act receive appropriations every year.) These federal funds are made available to state agencies and local governments each fall.

### Virginia Coastal Program Funding 1986-1997



## USING THE PROJECTS CATALOGUE

This first edition of the Virginia Coastal Program Projects Catalogue contains a compendium of projects that have received funding from the Program since its inception in 1986, concentrating on projects completed since 1992.

Periodically, a catalogue of recently completed projects will be published.

Projects that are summarized in this issue are identified on the 1992 -1996 project lists beginning on page 96. Some projects on these lists are still in progress and will be summarized in future catalogue issues.

Catalogue summaries include a brief description of the completed project, including a discussion of the project's primary goals, relevant background information, and a synopsis of documents or reports which have been published. A contact name and number is provided to facilitate communication and dialogue with project managers. Please make requests for copies of project materials to the contact listed.

### SAMPLE ENTRY

**Title of project or document:**

#### **Natural Heritage Resources Fact Sheet**

**Description/goals of project/  
description of documents or  
reports produced:**

A series of educational fact sheets written and distributed which describe, not only the rarest species, natural communities, and invasive species in the Coastal Zone, but also natural area protection and management tools. These facts sheets are used to promote the conservation of the biological diversity in Virginia's coastal zone, and have been distributed to public and private natural area owners, citizens, localities, natural resource agencies, and conservation organizations. They are also available on the DCR, Natural Heritage web site ([www.state.va.us/ndcr/vaher.html](http://www.state.va.us/ndcr/vaher.html)).

The topics of the fact sheets include: Rare Natural Environments: Sea-level Fens, seasonal ponds, Turkey Oak Sandhills, Bald Cypress-Water Tupelo Swamp, Pocosins; Natural Area Protection: What is Natural Area Dedication?, What is a Natural Area Management Agreement?, Fire and Natural Areas: An Overview, Natural Area Stewardship; Invasive Alien Plant Species of Virginia: Mile-a-minute, Porcelain-berry, Kudzu, Asiatic Sand Sedge, Tree-of-Heaven.

**Agency responsible:**

**Project contact:**

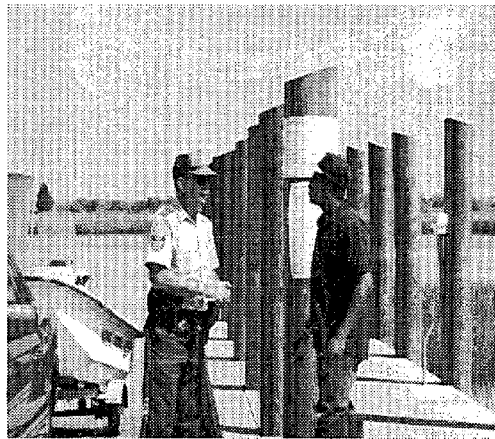
**Date reports published:**

**Grant year/task number:**

Virginia Department of Conservation and Recreation  
Contact: Kevin Heffernan, Division of Natural Heritage,  
804.786.7951  
June 1994  
1992 Task 2.5



## **Coastal Technical Assistance**



# Coastal Technical Assistance

*The Virginia Coastal Program has used its funding to enhance the state's ability to manage coastal resources by supporting coastal technical professionals in Tidewater planning district commissions and local governments, as well as in state natural resource agencies.*

## Environmental Impact Review and Federal Consistency

Projects occurring in Virginia's Tidewater area, or Coastal Zone, must be consistent with Virginia's Coastal Resources Management Program. The Virginia Coastal Program provides funding for positions in the Office of Environmental Impact Review (EIR), located in the Virginia Department of Environmental Quality.

The primary function of EIR is to coordinate the State's response to the environmental impacts of proposed state and federal projects. Project proposals are distributed for review to state agencies, planning districts and localities for comment. After considering all comments received, EIR prepares a single state response. EIR receives the following types of environmental impact statement documents: federal environmental impact statements and environmental assessments; state environmental impact reports; operating and expansion permits for public airports or landing fields; environmental documents pertaining to the exploration and extraction of minerals on state-owned lands; and environmental impact statements for application for drilling permits in the Tidewater area. Highway projects are handled exclusively by the Virginia Department of Transportation.

*Virginia Department of Environmental Quality,  
Contact: Tom Felvey, 804.698.3416  
Current Ongoing Activity  
1992 - 1996 Task 3*



## Local Environmental Planning Assistance Program

Environmental planning assistance is provided through this program to local governments in portions of Virginia's coastal zone. This expertise is particularly important given the current rate of development in the coastal area, the current demands placed on local government staff, and the resource constraints faced by many localities. Planning assistance is made available through a network of local government liaisons who are assigned to work with Tidewater localities. The range of technical assistance provided through this network includes help in preparing local zoning, subdivision, erosion and sediment control, stormwater management ordinances, and comprehensive plans. The program also provides advisory review and comment to local governments on proposed private development projects.

*Virginia Chesapeake Bay Local Assistance Department  
Contact: Scott Kudlas, 804.225.3440  
1992 Task 4, 1993 Task 4, 1994 Task 9, 1995 Task 8, 1996 Task 6  
(Until 1992, Local Planning Assistance Component housed at the Virginia Council of the Environment -  
1986 Task 1, 1987 Task 3, 1988 Task 3, 1989 Task 3, 1990 Task 4, 1991 Task 4)*



# Coastal Technical Assistance

## Virginia Marine Resources Commission Permit Compliance and Inspection

The Virginia Marine Resources Commission (VMRC) is the Coastal Program's core agency responsible for issuing permits on encroachments in, on, or over state-owned submerged lands. The Commission has had this regulatory authority since 1962, and currently processes approximately 2,000 applications, and issues nearly 500 permits annually. Virginia is only one of six "low-water states" and as such maintains ownership of all submerged lands channelward of the mean low water mark in tidal waters, and regulatory authority channelward of the ordinary high water mark on most naturally occurring nontidal perennial streams, creeks and rivers. In addition to managing the 1,472,000 acres of submerged lands, the Commission also regulates the use or development of tidal wetlands and coastal primary sand dunes pursuant to the provisions of Chapter 13 and 14 of Title 28.2 of the Code of Virginia. Local governments in Tidewater Virginia have the option of adopting and locally administering wetlands and dune zoning ordinances. VMRC maintains original jurisdiction in localities which have not adopted ordinances. Even if ordinances are locally adopted and implemented, the Commission retains certain oversight responsibilities and reviews all decisions made by local wetlands boards.

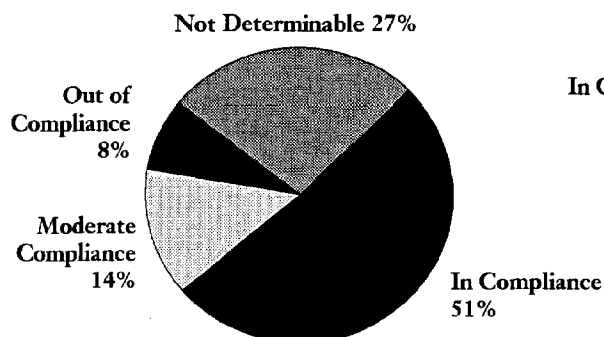
The Coastal Program has provided funding for the above VMRC activities since 1987. Funding began with the support of clerical positions, which concentrated on permit processing and historic permit data entry. In 1991, a study showed the need for strengthening permit compliance monitoring policies. The General Assembly then granted VMRC the authority to issue restoration orders and to assess civil charges, and VMRC began the development and implementation of a new permit compliance inspection program. Additional environmental engineers, funded by the Coastal Program, were hired to carry out this work. Since the new authority measures and compliance program were put in place, compliance has increased significantly. In 1989, a random check of projects found only 51% in compliance; by 1993, inspections revealed 80% of all projects to be in compliance. VMRC is currently working towards the goal of determining cumulative and secondary impacts of coastal development. The first step in making this determination is to geographically reference all permits. This work is underway.

*Virginia Marine Resources Commission  
Contact: Tony Watkinson, 804.247.2255  
Current Ongoing Activity Since 1987*

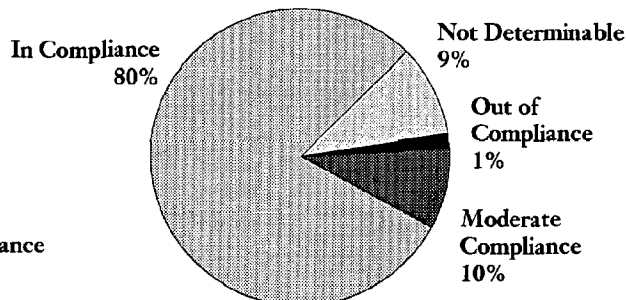
*1992 Task 9, 1993 Task 17, 1994 Task 22, 1995 Task 13, 1996 Task 19*



### Inspections of VMRC Permits



Inspections since 1993 of all VMRC permits following notification that projects had been started.



Inspections for randomly selected projects including wetlands and VMRC subaqueous permits issued in 1989.

Data Source for Graphics: Virginia Marine Resources Commission Permit Compliance and Inspection Report, October 1996



# Coastal Technical Assistance

## Technical Assistance by Planning District Commissions

From 1986 until the FY 97 grant year, the Coastal Program allocated a portion of its award from NOAA to its eight planning district commissions in support of regional coastal technical assistance programs. Virginia's Tidewater planning district commissions include: Accomack-Northampton PDC, Crater PDC, Hampton Roads PDC, Middle Peninsula PDC, Northern Neck PDC, Northern Virginia PDC, the Rappahannock Area PDC (RADCO), and Richmond Regional PDC.

This technical assistance included various activities coordinated or provided by the PDCs to their member localities. Funding also supported technical research and regional cooperative planning studies and initiatives at the PDC. The continuing nature of the PDC Technical Assistance Program enabled the eight coastal PDCs to develop permanent staff expertise in coastal and related environmental resource issues. Examples of past and current program activities at the coastal PDCs include: cooperative regional programs in stormwater management, erosion and sediment control, wetlands identification, and GIS development. The success of these programs is such that many localities in the PDCs are now supporting expanded programs with significant local funding.

The PDCs provide technical assistance to local governments in areas such as comprehensive plan and ordinance development, resource development and management planning, project and environmental impact reviews, grant writing, and GIS development. PDCs coordinate participation in state agency activities, such as the development of state tributary strategies. Regional assistance enables many localities to pursue more innovative and cooperative approaches.

The PDCs support a variety of training activities for local government officials, citizens, industry, environmental organizations, and civic groups in the above-mentioned programs. The PDCs also serve as information clearinghouses and environmental impact reviews.

*Northern Virginia Planning District Commission*  
Contact: David Bulova, 703.642.0700  
1990 - 1996 Task 31



*Crater Planning District Commission*  
Contact: Victor Liu, 804.861.1666  
1990 - 1996 Task 335



*Rappahannock Area Development Commission*  
Contact: Sandra Rives, 703.373.2890  
1990 - 1996 Task 32



*Middle Peninsula Planning District Commission*  
Contact: Jim Uzel, 804.758.2311  
1990 - 1996 Task 36



*Northern Neck Planning District Commission*  
Contact: Stuart McKenzie, 804.529.7400  
1990 - 1996 Task 33



*Hampton Roads Planning District Commission*  
Contact: John Carlock, 757.420.8300  
1990 - 1996 Task 37



*Richmond Regional Planning District Commission*  
Contact: Larry McCarty, 804.358.3684  
1990 - 1996 Task 34



*Accomack-Northampton Planning District Commission*  
Contact: Jim McGowan, 804.787.2936  
1990 - 1996 Task 38



# Coastal Technical Assistance

## Local Government Wetlands and Environmental Compliance

Local government positions have been funded by the Coastal Program to assist localities in efforts to ensure compliance with local environmental programs. These programs primarily include tidal wetlands protection, erosion and sediment control, stormwater and floodplain management, site plan review and Chesapeake Bay Preservation Act activities. Two of these positions serve a regional area. The benefits of a regional environmental position includes: 1) flexibility to respond to the varying and changing needs of the county or counties served; 2) an ability to identify regional needs as well as local needs; 3) the sharing of ideas, methods and experiences between counties or localities; 4) an efficient transfer of information among counties or localities; and 5) an increased number of site inspections and more consistent follow-up of noncompliance. These local environmental positions have also assisted in the coordination of regional environmental educational activities, including tidal wetlands training, and erosion and sediment control training. They have also helped improve interaction between state agencies and local government officials and citizens.

The Northern Neck, a four-county region, is served by a Wetlands Engineer who rotates between the land use offices in Lancaster, Westmoreland, Northumberland and Richmond counties. The other Wetlands Engineer serves the Middle Peninsula counties of Essex, King and Queen and King William. The third position, an Environmental Enforcement Specialist for Middlesex County, supplies not only the types of assistance discussed above, but also provides technical support to the local Wetlands Board.

### *Wetlands Engineer*

*Essex, King & Queen, King William*

*Contact: Gary Allen/Brian Wagner, 804.443.4331*

*1992 Task 53, 1993 Task 54, 1995 Task 57, 1996 Task 53*

### *Wetlands Engineer*

*Northern Neck Planning District Commission/Lancaster County*

*Contact: Bill Pennell/Josie Wold, Lancaster County Administrator, 804.462.5129*

*1993 Task 61, 1994 Task 62, 1995 Task 63, 1996 Task 56*

### *Environmental Enforcement Specialist*

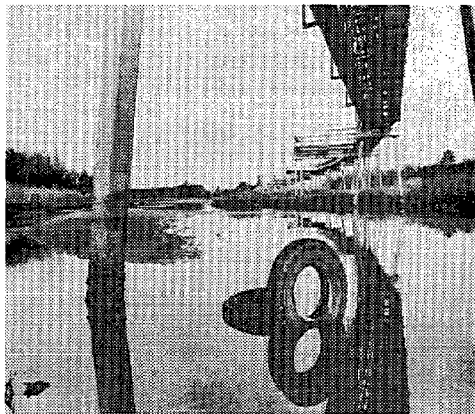
*Middlesex County*

*Contact: Charles Culley, Middlesex County Administrator, 804.758.4330*

*1993 Task 58, 1994 Task 59, 1995 Task 61, 1996 Task 58*



# **Environmental Management**



# Environmental Management

## Management of Cumulative Impacts in Virginia: Identifying the Issues and Assessing the Opportunities

This study, conducted by the Institute for Environmental Negotiation at the University of Virginia, explores both the concept and practice of cumulative impact management. It focuses on the definition of cumulative impacts, obstacles which make their assessment and management a difficult challenge, current practices in Virginia as well as other states, and proposed strategies for advancing cumulative impact management. This report also includes a section on selected cumulative impact management approaches in the other states, and a reference section containing titles of reports and documents pertaining to cumulative impact issues available in these other states.

*Virginia Department of Environmental Quality*  
Contact: *Laura McKay, Virginia*  
*Coastal Program, 804.698.4323*  
*December 1991*  
*1990 Task 13*



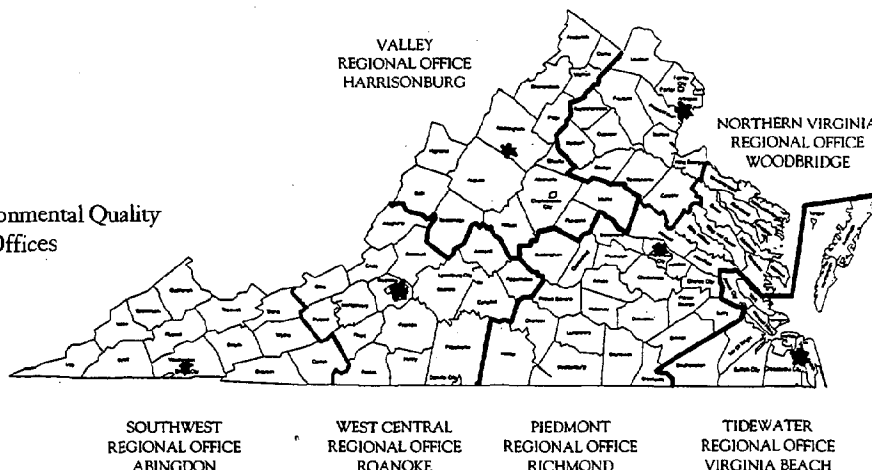
## Business and Industry Guide to Environmental Permits in Virginia

This comprehensive guide to environmental permits was produced by the Virginia Department of Environmental Quality in cooperation with the Virginia Marine Resources Commission and the Virginia Department of Agriculture and Consumer Services. It provides company owners, plant operators, local economic development officials and the general public a convenient, concise source of basic information on state environmental and permit programs. The main focus of this guide is on those actions which must be taken before an individual or business can construct or start up a facility or process that will result in emissions to the air, water or land. Comments about this guide and suggestions for improving it are welcome.

*Virginia Department of Environmental Quality*  
Contact: *Bill Hayden, 804.698.4447*  
*February 1993, Reprinted July 1996*  
*1991 Task 4*



Department of Environmental Quality  
Regional Offices



## A General Guide to Environmental Regulations in Virginia

This booklet is a general guide to environmental laws, regulations, and the permits necessary for land development and the establishment of businesses in Virginia. It is designed to assist local officials, small businesses, developers, and citizens in understanding the purposes and procedures of Virginia's environmental regulatory programs.

*Virginia Department of Environmental Quality*  
Contact: *Bill Hayden, 804.698.4447*  
*January 1992*  
*1990 Task 4*



# Environmental Management

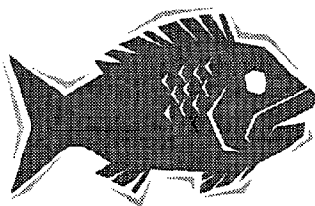
## Bioaccumulation Initiative - Phase III

The Virginia Water Control Board (now the Department of Environmental Quality) initiated its Toxic Fingerprinting/Bioaccumulation (TFP/BA) Program in response to increasing concerns by the Board and the EPA about the human health aspects of environmental protection. In Phase I, the TFP/BA Program screened over 200 sites statewide for the presence of bioaccumulative compounds in their discharges. In Phase II, 32 sites from Phase I, which contained higher-than-average numbers of bioaccumulative compounds, were resampled to identify the most prevalent bioaccumulative compounds entering Virginia's waters. In Phase III, which was funded by the Virginia Coastal Program, samples of receiving-stream sediment, fish and/or shellfish were collected from selected Phase II sites and other industrial sites with similar effluent compositions. The final report includes a list of these sites, and the study's findings.

Phase II and Phase III data indicate that relatively few bioaccumulative compounds are currently being released through point and nonpoint source discharges. However, significant exceptions were identified. Data further indicate that sediments in Virginia's coastal zone represent a potentially substantial source of bioaccumulative compounds, apparently due to historical and/or episodic releases. Tissue data indicate sediment-related compounds are accumulating in indigenous fish and shellfish to an extent which may increase human health risks. These data suggest that bioaccumulation of sediment compounds through the food chain is a more immediate problem with regard to human health risk than water-borne compounds.

These studies have contributed to initiating environmental remediation at several of the sites investigated. An analysis of sediment toxicity in the Chesapeake Bay is currently underway as of summer 1997. (1995 Task 11)

*Virginia Department of Environmental Quality*  
Contact: David Grimes, 804.698.4203  
March 1994  
1992 Task 19



## Energy Facilities Inventory

This inventory provides the location, fuel, and energy capacity or output of various energy facilities in Tidewater Virginia. It details the proximity of energy facilities to population centers, transportation corridors, and natural resources.

*Virginia Department of Environmental Quality*  
Contact: Virginia Witmer, Virginia Coastal Program,  
804.698.4320  
December 1991  
1990 Task 11



## Permit Compliance and Inspection Program: Findings and Guidance Document

A survey was designed to investigate and gauge the effectiveness of the various compliance monitoring programs being used by VMRC and local wetlands boards. The intent of the survey was to identify existing compliance shortcomings, and to ascertain effective compliance monitoring techniques in order to develop concise recommendations to enhance monitoring programs.

In 1991 the report entitled **Permit Compliance and Inspection Program: Findings and Guidance** documented the results of this survey and provides recommendations for implementation of effective compliance monitoring techniques. These recommendations have been implemented since 1992. The Virginia Marine Resources Commission continues to evaluate the effectiveness of its Permit Compliance and Inspection Program, monitoring techniques and recommending changes as appropriate.

A Permit Compliance and Inspection Program report has been prepared each year since 1992. This report compares compliance data compiled for new projects and compliance data for projects permitted prior to 1991, when recommendations in the 1991 guidance document were implemented. In 1992 a standardized, comprehensive permit compliance and inspection program was instituted, and a computer tracking system set up.

*Virginia Marine Resources Commission*  
Contact: Bob Grabb, 804.247.2200  
December 1991  
1990 Task 13



See Also: Coastal Technical Assistance, page 4:  
*Virginia Marine Resources Commission*

# Environmental Management

## Best Management Practices: An Assessment of the Barrier Island Policy and the Coastal Primary Sand Dune Act

This report focuses on Accomack County and Northampton County and evaluates the effectiveness of the revised Barrier Island Policy in reducing the environmental impacts associated with man's increased activities on Virginia's barrier islands. It recommends the best management practices for shoreline development activities which encroach in, on, or over Virginia's tidal wetlands coastal primary sand dunes, beaches, and submerged lands.

*Virginia Marine Resources Commission*  
Contact: Tony Watkinson, 804.247.2200  
March 1993  
1991 Task 17



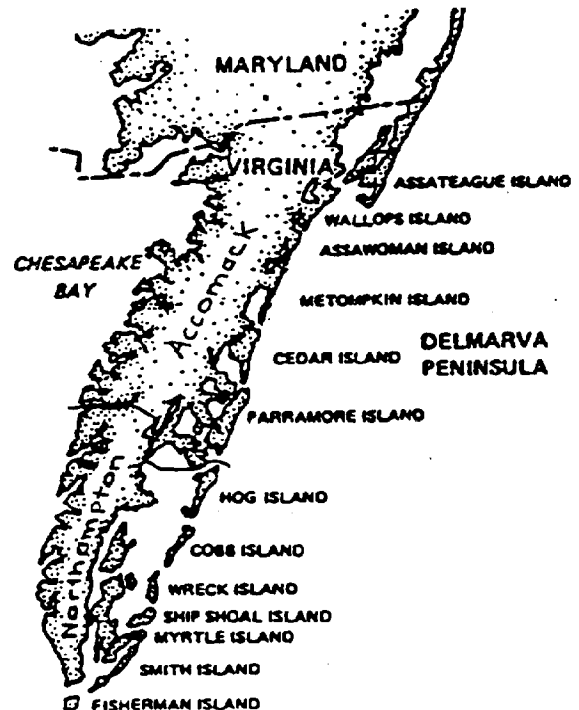
## Subaqueous Guidelines

"Tidewater Virginia" as defined in the Code of Virginia encompasses approximately 5,000 miles of shoreline. There are roughly 2,300 square miles, or approximately 1,472,000 acres, of tidally influenced submerged lands. This is an area larger than the state of Delaware and represents major responsibility for State government. Increasing developmental pressures along our shorelines affect these submerged lands. The **Subaqueous Guidelines Handbook** was developed and issued by the Virginia Marine Resources Commission in 1976 and revised in 1986. It includes a set of criteria by which to evaluate projects in the Coastal Zone to assure consistency of decisions; and to inform applicants regarding the degree of acceptability of project proposals affecting subaqueous lands.

*Virginia Marine Resources Commission*  
Contact: Tony Watkinson, 804.247.2200  
published 1976, revised March 1986,  
reprinted September 1993  
1992 Task 9



## Delmarva Peninsula and Virginia's 13 Barrier Islands



## Risk Assessment at Cheatham Annex

This study of Cheatham Annex focuses on questions regarding hydrology and contamination of the site by organic compounds and metals stored there since the 1940s. The study evaluates hydrological factors which may be important in the transportation of contaminants and provides a preliminary characterization of organic and heavy metal contamination in areas believed to be sensitive or indicative of the general status of the site as a whole.

*Virginia Department of Environmental Quality*  
Contact: K. C. Das, 804.698.4184  
November 1990  
1989 Task 10



# Environmental Management

## Natural Heritage Resource Maps, Information and Technical Assistance

Virginia's Coastal Zone is home to an impressive array of rare plant and animal species and natural communities - "natural heritage resources." In order to sustain the region's economic growth without sacrificing its biodiversity, local and regional planners and decision-makers must have access to accurate, scientific information about natural heritage resources. This project produced 11" x 17" color maps showing the general location of natural heritage resources in relation to major roads and water bodies for each county and city in the coastal zone. These maps were distributed to planners in each county, city, and Planning District Commission in the Coastal Zone. The maps streamline project planning and facilitate responsible growth, because they inform planners about those areas in which proposed activities and developments are less likely to impact documented natural heritage resources. The maps also alert planners to areas in which additional information will be needed to ensure that projects can be designed to avoid impacts.

In 1994, in order to increase the availability and utility of natural heritage resources data, a Locality Liaison was funded to work with planners in Coastal Zone counties, cities, and Planning District Commissions. The Liaison informs the planners about the data and services of the DCR-Division of Natural Heritage, provides them with updated maps, reports and digital data, and provides prompt, detailed responses to requests for project reviews and natural heritage information. The Locality Liaison also works with other natural resource agencies, including the Army Corps of Engineers, the Chesapeake Bay Local Assistance Department and the Department of Game and Island Fisheries, to facilitate access to more comprehensive information early in planning processes. This project will be continued into 1997 with additional map and data updates, increased emphasis on presentations, and pilot assistance to localities in the identification of habitat restoration opportunities.

*Virginia Department of Conservation & Recreation*

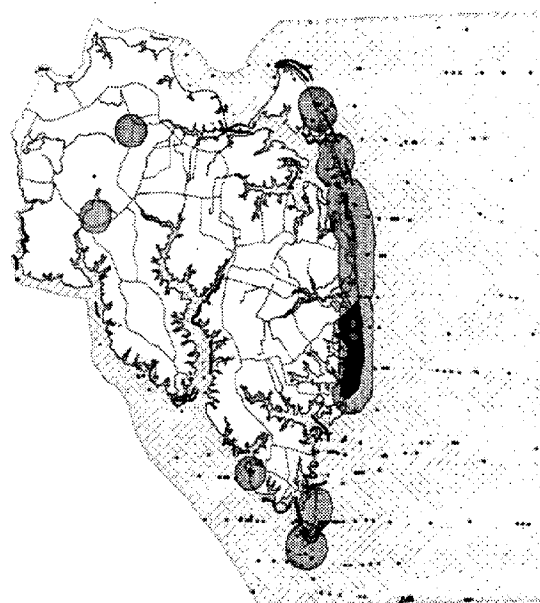
*Contact: Steven Carter Lovejoy, 804.786.7951*

*October 1997 (current maps)*

*1993 Task 23, 1994 Task 11a, 1995 Task 16, 1996 Task 11*



Virginia Beach



Gloucester County

# Environmental Management

## Natural Resource Mapping for Coastal Zone Management Planning

As the primary wildlife and freshwater fish management agency in the Commonwealth, the Virginia Department of Game and Inland Fisheries has developed comprehensive and reliable interrelated statewide computer information systems containing thousands of records about fauna and associated habitats. The agency has selected particular categories of wildlife and habitat resources for mapping because of their economic, recreational, or ecological importance within the coastal zone.

Several major species groups were selected for mapping, and various state and federal agencies were contacted to collect information relevant to the species groups. The information mapped includes anadromous fish upper extent migration areas and upstream use areas, marine mammal and sea turtle live observations and use areas, winter waterfowl concentrations, nesting waterfowl areas, colonial nesting bird colonies, federal and state endangered and threatened animal locations, and wildlife viewing areas. Digitization was performed on "1:100,000" scale maps using an ArcInfo geographic information system to define the natural resource information gathered. Data were verified by the species experts during initial definition and positioning on DeLorme Gazetteer maps. County maps were prepared which display the distribution of the various resources.

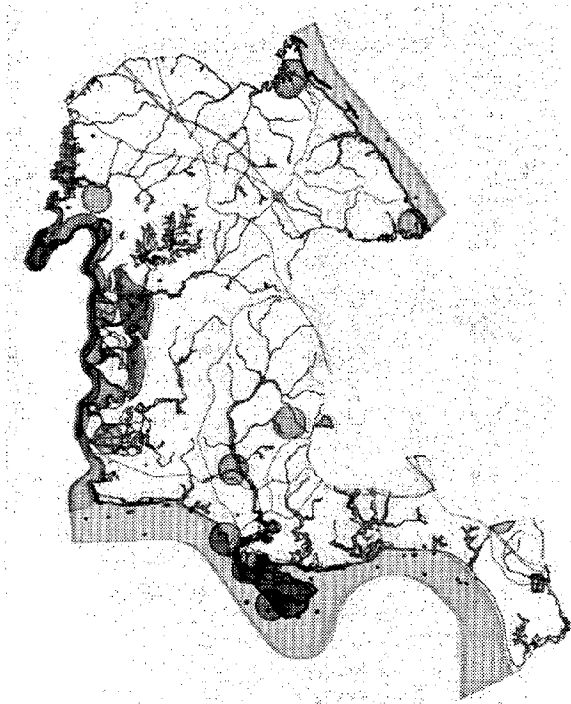
The data and maps produced should be useful in the protection of natural resources; the management of coastal development, the prioritization of coastal-dependent uses; the development or enhancement of recreational opportunities and corresponding economic interests; comprehensive planning; and improved coordination among local, regional, state and federal agencies. The report produced includes general information on the specific map layers, as well as detailed information for each Planning District Commission (PDC) and county/city in Virginia's coastal zone. The appendices provide additional contacts, references, and species information not detailed in the PDC/County resource lists.

*Virginia Department of Game and Inland Fisheries*

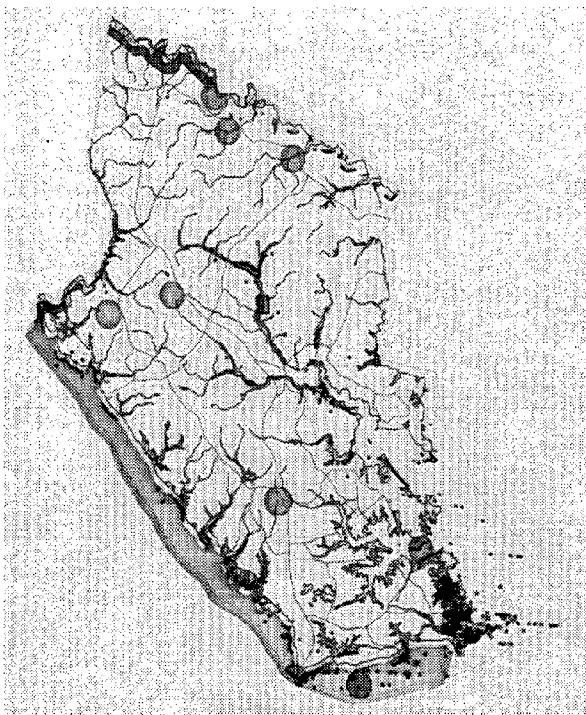
*Contact: Rebecca Wajda, 804.367.8351*

*March 1996*

*1994 Task 11b*



James City County



Mathews County



# Environmental Management

## Coastal Historic Resources Inventory Program - Phase I

In an effort to more easily identify regions of historic significance and divert development from these areas, the Geographic Information System database for all Historic Landmark Register Sites and historic easements in Virginia's coastal zone was initiated. This geographic-based tool presents a methodology for formatting information found on USGS quadrangle maps to a GIS database.

*Virginia Department of Historic Resources*  
Contact: Robert Carter, 804.722.3428  
March 1992  
1990 Task 5.4  
❖

## Geographic Information System Database to Manage Virginia's Underwater Archaeological Resources

This project converted an existing underwater archaeological database from the relational database Paradox to the spatial database ArcInfo. This conversion makes it possible for users to expand their research and monitoring activities to include: spatially-oriented risk assessment models, predictive models for the identification of new sites, and enhanced management planning. Products produced during this project include a map portfolio, a series of large-format color maps displaying the distribution of underwater archaeological resources within the Virginia portion of the Chesapeake Bay and the Virginia Coastal Plain, and an ArcInfo database.

*Virginia Institute of Marine Science*  
Contact: Marcia Berman, 804.642.7188  
November 1995  
1994 Task 2.3  
❖

## Coastal Historic Resources Inventory Program - Phase II

Developed for use by the Virginia Department of Historic Resources, the final product is a Geographic Information System database of nearly 1700 historic districts, buildings and sites. All properties in the database are either on the National Register of Historic Places or the Virginia Historic Landmark Register. Information for each property includes: the property name, the U.S. Park Service identification number, National Historic Landmark status, the Virginia Historic Resources file number, and an indication of whether the state holds an easement on the property.

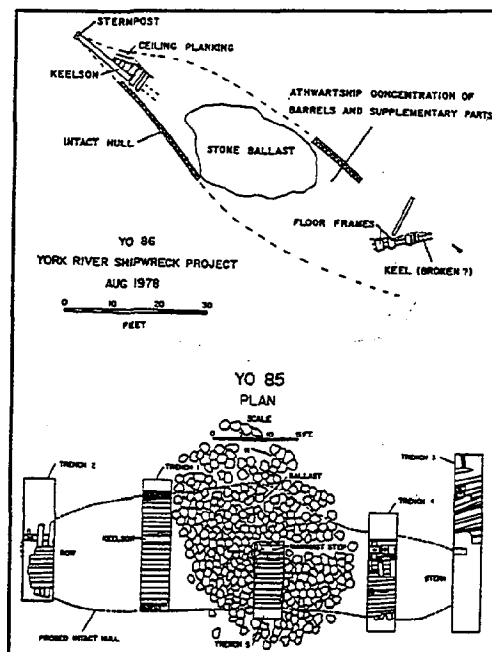
*Virginia Department of Historic Resources*  
Contact: Robert Carter, 804.722.3428  
September 1993  
1992 Task 5.1  
❖

## Comprehensive Coastal Inventory Program and the Tidal Rivers Inventory Project

The primary objective of the Comprehensive Coastal Inventory was to develop, update, and maintain an inventory of the Virginia tidal shoreline using a geographical information system (GIS). The focus of the project was the delineation of environmentally sensitive zones for shoreline management programs. The system can be queried for quantitative assessments of shoreline conditions.

*Virginia Institute of Marine Science*  
Contact: Carl Herslmer, 804.642.7387  
February 1993  
1991 Task 5.1  
❖

# Environmental Management



Yorktown Shipwreck Plan Views

## An Assessment of Virginia's Underwater Cultural Resources

An assessment was made of known underwater cultural resources in an effort to determine their educational value and how best to manage them. A total of 283 underwater sites are recorded in the files of the Virginia Department of Historic Resources. These consist of 181 sites with historic components and 90 with prehistoric components; 14 others have not been dated. 46 of the historic sites are "wrecks." Only three of the prehistoric sites appear to be fully submerged, as most are eroding along shorelines. These statistics give a clear measure of how under-represented underwater historic resources are in official records. Locational models and historical records target sensitive areas for unidentified submerged sites. Future priorities should include surveys to inventory representative areas, commitments to the preservation and management of important known sites, and a program of information exchange with watermen. This assessment was prepared through a contractual agreement between the Virginia Department of Historic Resources and the College of William and Mary Center for Archaeological Research. Management recommendations and strategies for sensitive historic sites are proposed.

*Virginia Department of Historic Resources*

*Contact: Catherine Slusser, 804.786.3143*

*November 1994*

*1993 Task 11*



*See Also: Public Education, page 68 -  
History Under Water: Exploring Virginia's Underwater Historic Resources*

# Environmental Management

## Distribution of Submerged Aquatic Vegetation in the Chesapeake Bay

This on-going project recognizes that the monitoring of submerged aquatic vegetation (SAV) is necessary to assess the success of the Chesapeake Bay cleanup efforts. The Bay's SAV, or underwater grasses, are an important nursery ground for fish and crabs. Scientists have found that 30% more young crabs are found in areas with bay grass beds than in those areas without. These bay grasses also produce oxygen, reduce wave action, absorb the nutrient pollutants phosphorus and nitrogen, and trap sediments. In 1995, bay grasses shrank by 8% or 5,500 acres. This was a second annual decline for this important indicator of Bay health. A possible cause for the losses may be increased sediments and nutrient pollution loads due to spring floods in 1993 and 1994. Yet, overall, acres of grasses are up 60% from their historic low in 1984. As of 1995, grasses covered almost 60,000 acres. In 1993, the Chesapeake Bay Program partners, including Virginia, agreed to restore grasses to the historic levels of the 1970's, about 114,000 acres.

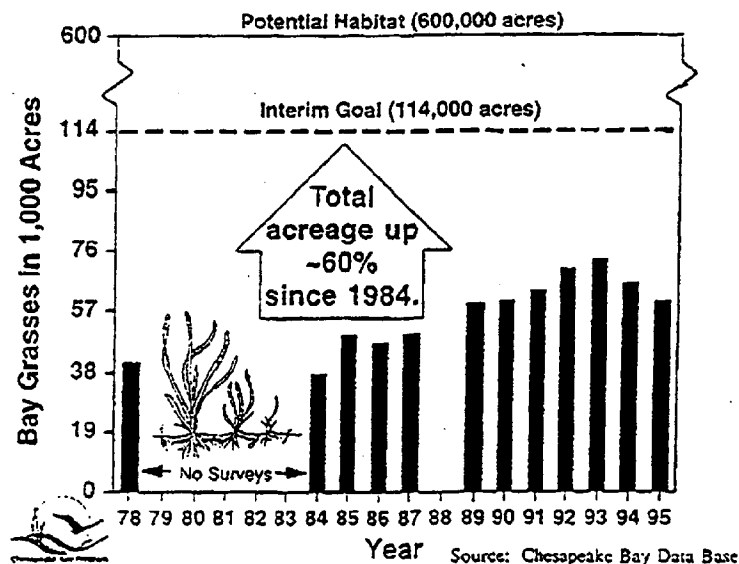
In the latest annual report (published 1996), the distribution of submerged aquatic vegetation in the Chesapeake Bay, its tributaries, and Chincoteague Bay is mapped at a scale of 1:24,000 using black and white aerial photography. Appropriate ground observations are used to substantiate presence or absence of SAV in particular areas. SAV bed perimeter information is digitized and stored in a computerized data base.

*Virginia Institute of Marine Sciences*

*Contact: Bob Orth, 804.642.7332*

*July 1996*

*1986 Task 9, 1987 Task 14, 1988 Task 17, 1989 Task 9,  
1990 Task 7, 1991 Task 7, 1992 Task 7, 1993 Task 12,  
1994 Task 15, 1995 Task 10*



# Environmental Management

## **A Remote Sensing and GIS Investigation of the Williamsburg Area Using High Altitude Aerial Photography and the AVIRIS Multiple Band**

This project produced a remote sensing analysis of the Williamsburg area using high altitude aircraft. The aircraft was deployed with two different types of remote sensing devices to compare the spacial and spectral resolution of 1) aerial photographic cameras and 2) a new generation of digital scanner (AVIRIS). The ability of AVIRIS to clearly delineate land classes was "most encouraging." Fine differences in marsh categories and very accurate classification of different forest types was possible with the AVIRIS sensor.

It was found that the AVIRIS scanner had some of the most powerful capabilities for GIS modeling due to the numerous band combinations that could be called upon to differentiate subtle shades in classifications and "fingerprinting" of spectral patterns. It was recommended that future work should be done in three areas: existing land use/land classifications; detection of disease and man-induced stresses on the environment; and exploration of advanced image processing and classification techniques for GIS modeling.

*University of Virginia  
Department of Environmental Sciences  
Contact: Herman Shugart, 804.924.0561  
March 1992  
1990 Task 5.1*

## **Automated Mapping and Leasing System**

This report describes the existing Engineering/Surveying Oyster Leasing System. It briefly covers the steps taken to create ARC/INFO coverages of four maps used in the VMRC, Fisheries Management Division, Engineering / Surveying's Oyster Leasing program. Sample maps of oyster lease grants are provided.

*Virginia Marine Resources Commission  
Contact: Gerald Showalter, 804.247.2270  
January 1992  
1990 Task 19*

## **Development of a Buffer Zone Evaluation Model/Procedure**

A procedure was developed for evaluating the impacts of proposed vegetative buffer modifications on buffer effectiveness. The procedure is based on modified hydraulic and detention models developed by Phillips for evaluating buffer effectiveness. The modified models consider the effect of concentrated flow and vegetative uptake on buffer performance.

*Virginia Department of Agricultural Engineering  
Virginia Polytechnic Institute and State University  
Contact: Theo Dillaba, V A Tech, 703.231.6813  
December 1992  
1991 Task 11*



## **Geographically Referencing Natural Resource Inventory Data for York River State Park**

Existing data layers were integrated with additional park-specific natural resource information to demonstrate the applicability of DCR's Arc/Info database as a coastal resource management tool for York River State Park.

*Virginia Department of Conservation and Recreation  
Contact: John Davy, 804.786.1119  
January 1992  
1990 Task 5.3*



## **King William County Real Property Identification Map**

This map of King William County was prepared by the Information Support Systems Lab of the Virginia Tech Agricultural Engineering Department in Blacksburg, Virginia. The County's tax maps were digitized and indicate various environmental factors such as wetlands, highly erodible and highly permeable soils, steep slope, and floodplains.

*King William County  
Contact: Dennis Carney, 804.769.4933  
November 1992  
1991 Task 58*



# Environmental Management

## Hampton Roads Comprehensive Regional Watershed Management Program

The Hampton Roads region faces a critical water supply shortage. Existing reservoirs in the urban areas are particularly suffering from the effects of inadequately managed development. It is critical that a proactive approach is taken to manage and protect the region's limited potable water supply. This project funded the development of a Watershed Management Resource Manual for use by the region's localities. It documents current watershed management strategies and provides localities with a set of tools which can be used to protect water supplies. The Comprehensive Regional Watershed Management Program also involved the development of a set of principles, the "Principles for Management of Water Supply Watershed", to guide cooperative relationships between water supply purveyors and water supply host communities.

An Interim Comprehensive Regional Watershed Management Program report is available which documents the current status of the program. It includes major portions of the Watershed Management Resource Manual. Local government program chapters are being reviewed by the affected localities, as are the state and federal program chapters.

The region's localities have committed additional local resources to maintain the Comprehensive Regional Watershed Management Program.

*Hampton Roads Planning District Commission*

*Contact: John Carlock, 757.420.8300*

*March 1997*

*1994 Task 67*



## Elizabeth River Restoration: A Watershed Action Plan to Restore the Elizabeth River

The Elizabeth River Project was founded "to form a *partnership* among the communities and all who earn their living from the river, to raise *appreciation* of its economic, ecological and recreational importance, and to *restore the Elizabeth River system* to the highest practical level of environmental quality" (mission statement 1993). A 120-member team of stakeholders, the Watershed Action Team, representing business, government, citizen and scientific concerns, drafted recommendations for reducing the environmental degradation of the Elizabeth River. The resulting *Watershed Action Plan to Restore the Elizabeth River* addresses 1) loss of habitat and aquatic life, 2) sediment contamination, 3) point source water pollution and 4) nonpoint source water pollution, and outlines an 18 point Action Agenda. The Elizabeth River Project has formed a partnership with the Commonwealth of Virginia to reduce toxics in the river, an important tributary of the Chesapeake Bay.

A public conference to launch the Elizabeth River Watershed Action Plan was held in June of 1996, and attended by prominent national figures and a large audience from all segments of society.

*Elizabeth River Project*

*Contact: Marjorie Mayfield, 757.625.3648*

*April 1996*

*1994 Task 27*

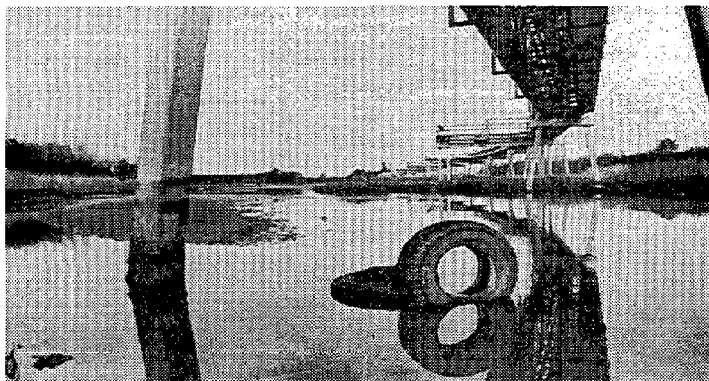
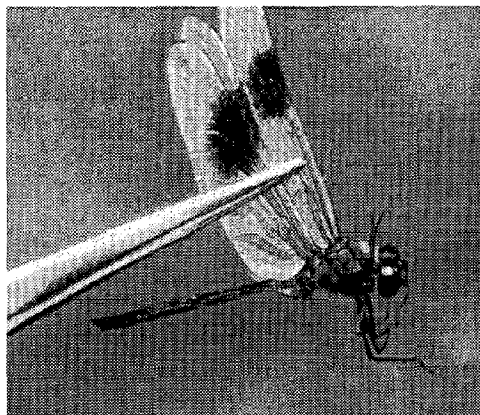


Photo courtesy of the Elizabeth River Project

The plan to restore the Elizabeth River includes the removal of hundreds, perhaps thousands of old tires.

# **Habitat & Wildlife Management**



# Habitat & Wildlife Management

## A Natural Areas Inventory of the City of Virginia Beach

This three-year inventory systematically identified the city's natural heritage resources. A natural heritage resource is defined as "the habitats of rare, threatened, or endangered plant and animal species, rare or state significant natural communities or geologic sites, and similar features of scientific interest" (VA Natural Area Preserves Act, 10.1-209 et seq. of the Code of Virginia). An initial contract between the City of Virginia Beach and the Department of Conservation and Recreation, Division of Natural Heritage (DCR-DNH), involved the collection and synthesis of existing information and preparation for field study, including the identification of areas that include unique or exemplary natural habitats.

Phase II of the natural areas inventory, funded by the Virginia Coastal Program, involved a field inventory, including the production of a series of topographic maps containing information on species occurrence and a complete listing of species ranked as endangered on a state, federal and global level. The Phase I report includes an overview of the study area, and a description of the methods used by DCR-DNH to conduct the field inventory. Results include a list of potential natural areas and an accompanying map; a summary of work completed to date; a list of natural heritage resources identified in the city; and a map showing locations of natural heritage resources as of September 1991.

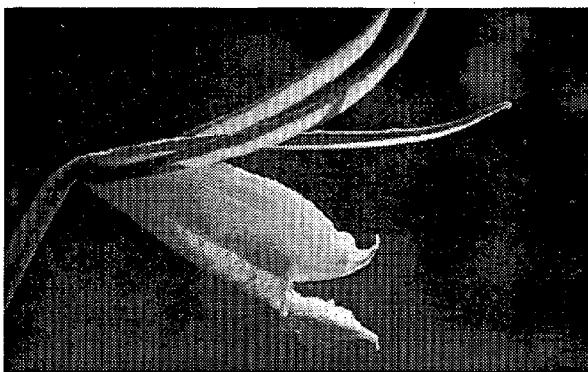


Photo by Hal Horowitz

Spreading pogonia (*Cleistes divaricata*), known in Virginia Beach only from the North Pocosin Natural Area.

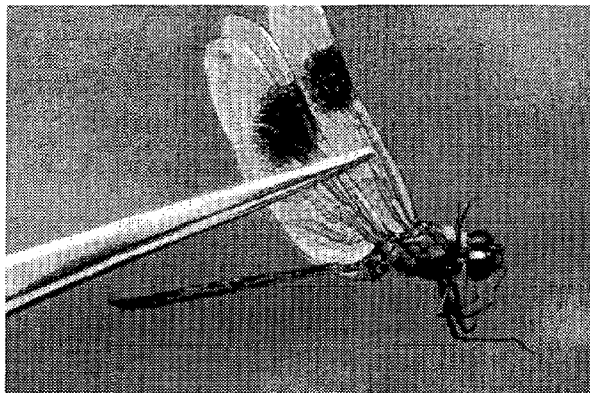


Photo by Kurt Buhlmann

The damselfly, or Four-spotted pennant (*Brachymesia gravida*), known in Virginia Beach from Seashore and False Cape State Parks.

In Phase III of this study, 23 natural areas were found to support natural heritage resources, including 20 rare vertebrate species, 39 rare invertebrate species, and 76 rare plant species. The delineation of conservation boundaries in this report are intended to be used to support wise planning and decision-making within the City.

The Phase IV report documents conservation planning for management and protection of natural areas identified in the natural areas inventory undertaken by the city and DCR-DNH in 1991 and 1992, and completed in March of 1993. New data collected were combined with existing knowledge from earlier inventory work to produce conservation boundaries for each natural area, including a site description, current status/ownership/use/zoning, recreational/scenic/educational considerations, and guidelines for protection of these particular areas. In addition, conservation boundaries were digitized for integration into the city's GIS. This report is currently being used as a reference by the city during review of city development plans, long-range planning, and development of a city conservation strategy.

*Virginia Department of Conservation and Recreation/  
City of Virginia Beach*

*Contact: Chris Ludwig, DCR-DNH, 804.786.7951/*

*Clay Bernick, Virginia Beach, 757.427.4621*

*November 1991, March 1993, June 1994*

*1990 Task 68, 1991 Task 70, 1992 Task 62*



# Habitat & Wildlife Management

## Conservation Planning for the Natural Areas of the Lower Peninsula of Virginia

This three-year inventory, conducted by the Department of Conservation and Recreation, Division of Natural Heritage, systematically identified the remaining natural areas of the City of Williamsburg, James City County, and York County. An overview of the geology and the existing natural vegetation of the lower peninsula was presented in the January 1992 report. The methods of the study are outlined and the results of the inventories are discussed. The natural areas identified during this study are described and future actions, including protection measures, are introduced.

In the March 1993 report, seven rare vertebrate species, ten rare invertebrate species, and forty-five rare plant species from the three localities are recorded. The information provided will facilitate well-informed planning and wise land use decisions by the local governments. The report is also being used to increase the awareness of local officials and residents of regional biodiversity issues, and to assist local conservation organizations in their land protection and environmental education efforts.

*Virginia Department of Conservation and Recreation*  
Contact: Ken Clark, 804.786.7951  
January 1992, March 1993  
1990 Task 71, 1991 Task 10



*Photo by Christopher Paguc*

Barking Tree Frog (*Hyla gratiosa*). York County.



*Photo by Richard H. Wiegand*

Virginia least trillium (*Trillium pusillum* var. *virginianum*). James City County.

## Conservation Planning for the Management and Protection of Natural Areas in the Albemarle-Pamlico Estuary

This plan, produced by the Division of Natural Heritage at the Department of Conservation and Recreation, facilitates improved natural area protection and management of the Virginia portion of the Albemarle-Pamlico Estuary by providing comprehensive information and guidance for the region. Fifty-seven sites were initially documented, with 11 natural areas and two natural area macrosites chosen for detailed study. Objectives included 1) development of natural area protection boundaries, 2) development of natural area management and protection strategies, 3) natural area landowner contact and education, and 4) implementation of site protection mechanisms. By combining new data with existing knowledge, each area is now defined by detailed description and refined boundaries, level of biodiversity, status and use of each site, ownership, and zoning. Landowner contact was an important component of this study, and the report contains a useful flowchart of the process used.

*Virginia Department of Conservation and Recreation*  
Contact: Larry Smith, 804.786.7951  
March 1994  
1992 Task 16





# Habitat & Wildlife Management

## Natural Area Source Book and Sample Natural Area Management Plans

Virginia's Coastal Resource Management Area is rich in biodiversity. At least 65 natural areas are found in public or private conservation ownership, and managed for their biodiversity and inherent natural values. The Virginia Department of Conservation & Recreation, Division of Natural Heritage, has produced a **Natural Area Source Book** and a model resource management plan for two natural areas within the coastal zone, North Landing River and Bethel Beach Natural Area Preserves. Both the source books and the resource management plans are designed to assist land managers, conservation planners, and resource experts with land stewardship.

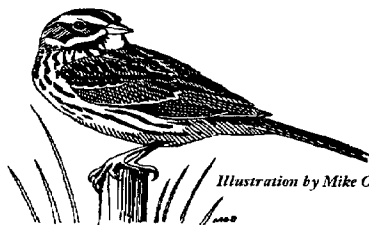
An interdisciplinary team of resource managers, scientists, and planners, knowledgeable regarding specific resources and management techniques, contributed to the production of these **Natural Area Source Books** and resource management plans. Each source book provides valuable information about the location of the natural area within the coastal zone; highlights opportunities for education and research; and includes a comprehensive guide to agencies, organizations, academic institutions, and individuals knowledgeable regarding natural area management and conservation issues; an extensive bibliography; and guide to resource management planning.

*Virginia Department of Conservation & Recreation*

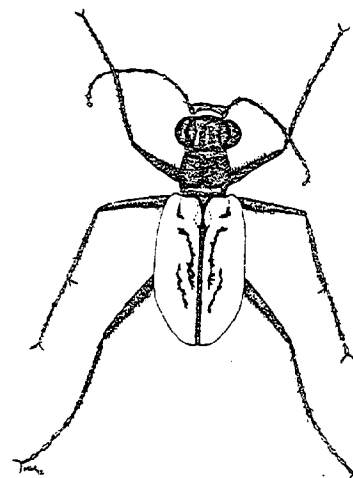
*Contact: Sandra Erdle, 804.786.7951*

*March 1995*

*1993 Task 10*

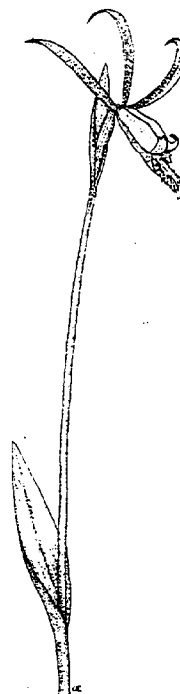


*Illustration by Mike O'Brian*



*Northeastern Beach Tiger Beetle  
Cicindela dorsalis dorsalis*

*Illustration by Megan G. Rollins*



*Spreading Pogonia  
Cleistes divaricata*

*Illustration by Caren A. Caljouw*

## Habitat & Wildlife Management

### Intertidal Oyster Reefs as a Tool for Estuarine Rehabilitation & Rejuvenation

The oyster resources of the Chesapeake Bay have been in a state of continuing decline for at least the past century. The combined effects of harvesting, disease and environmental degradation have all but removed the three-dimensional structure of oyster reefs which evolved in the Bay over the past 10,000 years and which were present when colonial settlement began. This project examined the option to rejuvenate local oyster stocks in a relatively pristine location, the Piankatank River, by providing intertidal oyster reefs with distinct three-dimensional topography, the like of which has been absent from the Bay for decades.

The project began in May of 1993 with construction of a reef on the footprint of a formerly productive natural reef. The reef was not seeded with oysters due to the desire to colonize the reef only from natural larval settlement, avoiding potential addition of adult oysters carrying endemic diseases. Despite short oyster settlement seasons in the summers of 1993 and 1994, oyster settlement and growth were observed at all tidal levels on the reef. Of particular interest, was the finding that oysters settle extensively within the matrix of the reef structure, up to 10 cm below the reef surface; and that these locations form refuges from predation or environmental extremes, allowing oysters to survive and grow rapidly. Individual oysters grew to over 60 mm in length over the summer of 1993 and 1994.

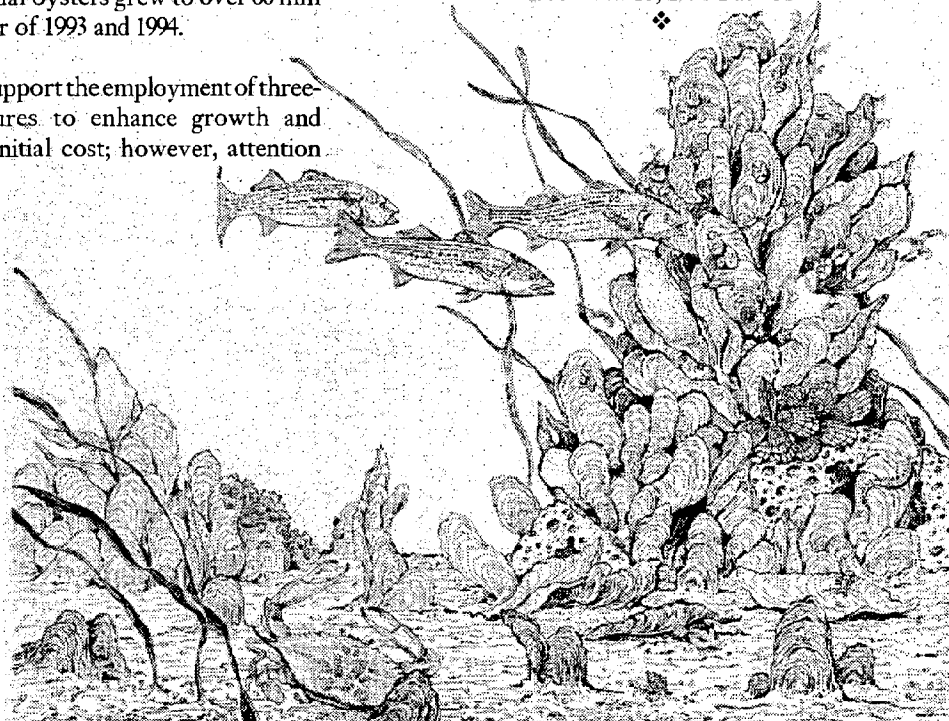
The August 1996 findings support the employment of three-dimensional reef structures to enhance growth and settlement despite their initial cost; however, attention

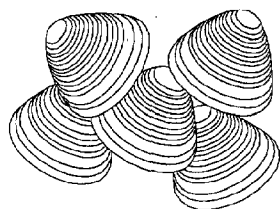
should be paid to micro scale changes in biology when building reefs. The ability of oysters to thrive within the matrix of the reef structure suggests that constructed reefs must have minimal thickness of overlaying shell veneer to optimize survival and growth.

With 1994 funds, this project continued to examine the biological value of intertidal, three-dimensional oyster reefs. Cumulative settlement of oysters in the study area over the summers of 1993-1995 has resulted in densities of oysters comparable with the extant oyster reefs in productive regions of the James River and the seaside of the Eastern Shore of Virginia.

Development of oyster populations and associated fish and invertebrate communities continue to encourage the employment of reefs to rebuild oyster stocks; however, such stocks are not immune from endemic diseases. By the end of the summer of 1995 *Perkinsus marinus*, commonly known as "Dermo" disease, was present at all tidal levels of the reef and associated mortalities were observed. Reefs can form concentrated populations of oysters which have beneficial value as spawning sanctuaries, but their value for increasing longevity of the individual oysters is probably limited.

*Virginia Institute of Marine Science/  
Virginia Marine Resources Commission  
Contact: Roger Mann, VIMS, 804.642.7360  
August 1996  
1993 Task 16, 1994 Task 21*



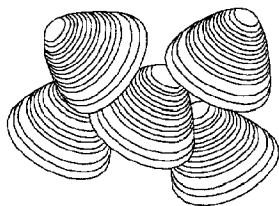


## Fishery Independent Stock Assessment of Virginia's Hard Clams Population of the Chesapeake Bay

The hard clam (*Mercenaria mercenaria*) is one of the most important commercial species harvested in Virginia's Bay waters. As the oyster and other commercially harvested species have declined, a portion of the displaced work force has joined the clamming fleet. Declining catches have raised concern for both watermen and fishery managers; however, little current information was available for either hard clam standing stock levels or age structure.

The current project used a fishery-independent stock assessment method using a hydraulic patent tong sampling device to survey hard clams in the James River-Hampton Roads area. When compared with results from previous stock assessment estimates in this area, the current clam densities and standing stocks were not obviously different. Age and size structure, however, has changed since earlier studies, with less larger and older clams in the current population. Declines in the commercial clammer's catch per day may be explained by a decrease of population in many once high density clam areas over the many years of fishing in a number of high density clam areas. Today's clam populations may be more uniformly distributed, resulting in the individual clammer catching fewer clams per day due to a limit on the number of daily tong grabs, and fewer clams in each tong grab made.

*Virginia Marine Resources Commission*  
Contact: James Wesson, 757.247.2121  
June 1995  
1993 Task 26  
❖



## Shellfish Habitat Restoration Through Remediation of Nonpoint Fecal Coliform

The purpose of this research project was to identify and explain nonpoint fecal coliform sources (i.e., *Escherichia coli* = *E. coli*) to tidal inlets using a combination of field and laboratory (molecular biology) techniques. Field biology techniques involved "tracking" elevated fecal coliform signals to their source and using a variety of observations to identify potential sources and recommend specific remediation. Molecular biology techniques relied on Restriction Endonuclease Digestion Profiles (DNA fingerprints) of *E. coli* samples of animals from known sources, e.g. deer, raccoon, otter and muskrat. The accumulation of fingerprinting patterns resulted in the development of a DNA Library, a DNA dichotomous key, and a library of Descriptions for the known strains.

To date, this research indicates that using field and laboratory methods, alone or in combination, provides a very high likelihood that nonpoint fecal coliform sources can be identified and remediated to improve water quality. According to the Department of Health, there has been a 55% increase in the number of acres condemned over the past decade for shellfish harvest in Virginia since 1970. Field tracking techniques alone have been highly successful in identifying the sources of nonpoint fecal coliform threatening the closure of shellfish areas. As a result, nearly 100 acres of previously condemned shellfish grounds have been reopened.

The DNA library has been challenged with a series of unknowns from several localities in the southern Chesapeake Bay. Of the 88 *E. coli* strains from unknown sources that were fingerprinted, 58 strains (66%) resulted in some degree of identification with known sources. Twenty-two strains (25% of the strains tested) resulted in identification with known strains in the library. Only eight strains suggest a human source. This is very significant considering that just a couple of years ago such identification seemed virtually impossible. The present scope of the DNA Library is modest (240 strains). Continued water quality remediation benefits will depend on the continued acquisition of *E. coli* strains from known sources, specifically *E. coli* strains from domestic animals whose fecal material can interact with tidal waters through stormwater runoff.

*Virginia Polytechnic & State University*  
Contact: George Simmons, 540.231.6407  
February 1997  
1995 Task 23  
❖

# Habitat & Wildlife Management

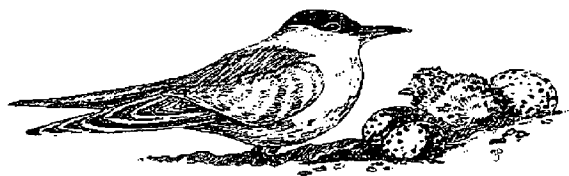


Illustration by Thelma Peterson

## Conservation Action Plan for the Avian Communities of the Virginia Barrier Islands

The Virginia barrier islands system has long been renowned for hosting large numbers of nesting, migrating and wintering colonial waterbirds, waterfowl, shorebirds, raptors, and songbirds. This system includes the barrier islands, the coastal bays and salt marshes, and the mainland and associated marshes. It has experienced far less human disturbance than any other barrier island-salt marsh system on the Atlantic coast.

The dynamic nature of the area makes it a unique and flourishing habitat for many of the avian species that are found here, but it also makes them much more subject to disturbances, both natural and human in origin. Numerous protection efforts have been initiated, including the establishment of refuges by federal, state, and private conservation groups. Virginia's barrier islands system has been designated as a "Man and the Biosphere Reserve" by the United Nations and by the Western Hemisphere Shorebird Reserve Network through its designation as an "International Shorebird Reserve." The Virginia Coast Reserve, a preserve of 14 islands under protection of The Nature Conservancy, has been designated as one of its "Last Great Places."

Although these efforts have gone a long way toward protecting this important natural resource, many threats place the avian communities in jeopardy. Threats include habitat loss and degradation, severe weather events, competition, predation, disease, contamination, disturbance, and water quality decline. This **Conservation Action Plan** addresses these threats and contains information on the status and trends of the avian communities in the barrier island system. It offers a menu of recommendations for potential actions in management, research, monitoring, and education that have been evaluated in terms of priority, feasibility, costs, partnerships, and measurability. The goal of the Conservation Action Plan is to ensure the long-term viability of the avian communities, species, and habitats in the Virginia barrier islands system through a partnership approach.

*Virginia Department of Conservation and Recreation/  
Virginia Coast Reserve, The Nature Conservancy  
Contact: Kennedy Clark, DCR-Natural Heritage, 804.786.7951/  
Barry Truitt, TNC, 757.442.3049*

*September 1996  
1993 Task 28*

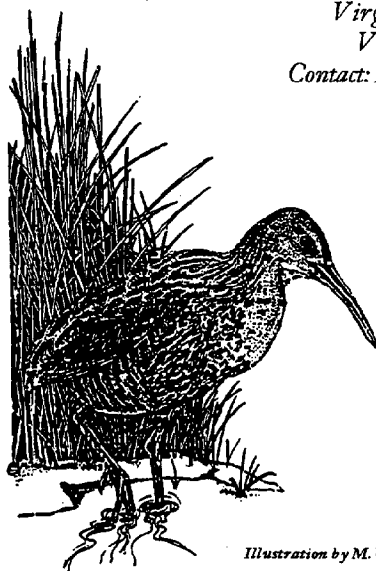


Illustration by M. Urbi Watts

## Habitat & Wildlife Management

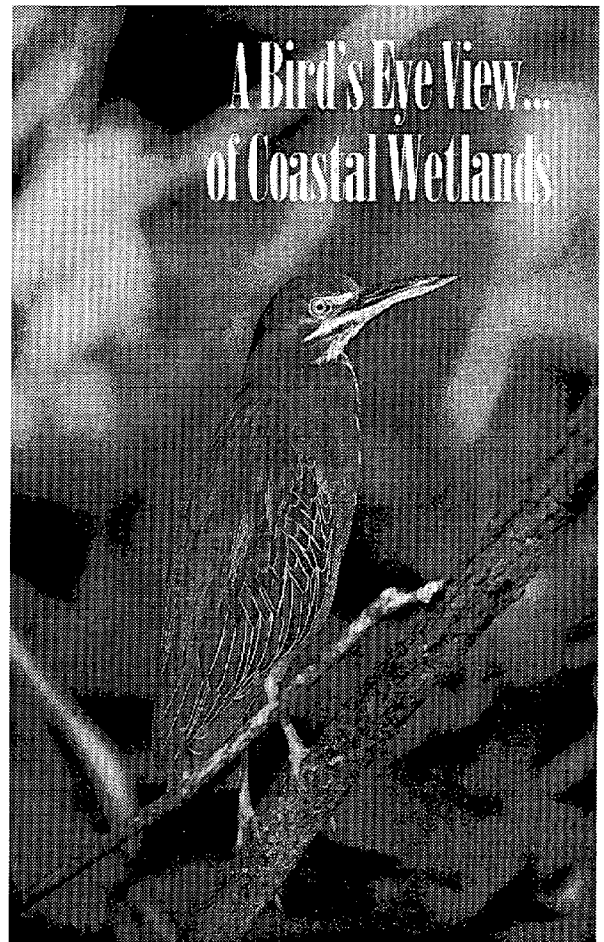
### Assessment of the Habitat Function of Tidal Wetlands for Rare, Threatened and Endangered Nesting Bird Communities in Virginia

Coastal surveys of Virginia's rare, threatened and endangered bird species were conducted. Literature review and field surveys were used to determine and describe habitat requirements of avian species which occur in wetlands in the coastal plain of Virginia. Information learned from these studies was applied to existing wetlands inventories in order to evaluate the function and value of these wetlands as wildlife habitat. The study determined that wetland or salt marsh size, or area, is a key factor in the incidence, abundance and species richness of marsh bird species. Area sensitivity was investigated by comparison of bird population densities in wetlands of different sizes which are otherwise similar in habitat characteristics such as plant community comparison. The implications of area sensitivity on the assessment of impacts of shoreline structures was explored.

This information is valuable to agencies and individuals involved in a coordinated, proactive conservation strategy of these species in Virginia. Accurate, up-to-date information is important for purposes of permitting and sound land use planning. A cutting edge methodology for assessing habitat, size, and spatial use of marshes was developed and tested. A final report entitled **Effects of Marsh Size on Incidence Rates and Avian Community Organization within the Lower Chesapeake Bay** was published.

A special issue of Virginia Wildlife magazine, **A Bird's Eye View ... of Coastal Wetlands**, were also published. Copies of this article was distributed to all county planners, wetlands boards, other local, state, and federal agencies, and the public.

*Virginia Department of Game and Inland Fisheries  
Contact: Bryan Watts, Center for Conservation Biology,  
College of William and Mary, 804.221.2247  
November 1993  
1992 Task 15*



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*The lives of at least 150 species of birds living in the Chesapeake Bay are bound to the health and complexity of our coastal wetlands. The more we learn, the more we realize how easily our actions can threaten their survival.  
(A Bird's Eye View...of Coastal Wetlands)*

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# Habitat & Wildlife Management

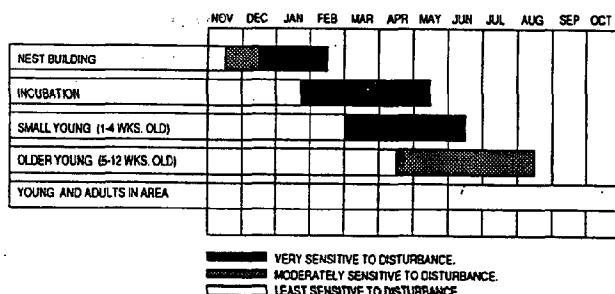
## Production and Implementation of a Habitat Suitability Model for Breeding Bald Eagles in the Lower Chesapeake Bay

Historically the Bald Eagle was a common breeder along major river systems. Breeding populations were decimated in the 1960s by pesticides, but have been showing signs of recovery due to pesticide bans. The Bald Eagle is now, however, threatened by habitat loss due to urbanization. This project, implemented in two phases, first develops a breeding habitat model for use in delineating potential breeding areas, then as a tool to identify critical habitat areas. The model uses 80 macrohabitat variables divided among four categories, including: topography, land use, habitat/vegetation, and human disturbance. Limiting factors developed from descriptive statistics are used to delineate and map the distribution of unusable and potential breeding habitat. Localities may use this information to steer land development in a direction conducive to eagle conservation.

*Virginia Department of Game and Inland Fisheries*  
Contact: Bryan Watts, Center for Conservation Biology,  
College of William and Mary, 804.221.2247  
January 1994  
1992 Task 14



### *Sensitivity to Disturbance*



Source: *The Bald Eagle of Virginia - An Information Booklet for Land Planners and Managers*



Illustration by M. Urbi Watts

## The Bald Eagle of Virginia: An Information Booklet for Land Planners and Managers

This document is for local and regional land planners and managers, and regulatory agencies. Two versions of this document were produced. The first is a full copy of all county maps and with potential breeding habitat. This collection of maps is intended to give regional planners a quick reference to all known eagle activity areas in the Coastal Plain. The second version is tailored to each individual county, and contains only the maps that pertain to that county. Habitat delineation maps were not produced for areas outside of the James and Rappahannock river corridors.

*College of William & Mary,*  
*Center for Conservation Biology*  
Contact: Bryan Watts, 804.221.2247  
June 1994  
1992 Task 2.4



See Also: Public Education, page 71:  
*The Bald Eagle of Virginia: A Management Guide for Landowners*

# Habitat & Wildlife Management

## Monitoring Avian Migration at Kiptopeke State Park

For more than 18 years the Kiptopeke Hawkwatch has been conducted by volunteers at what is now Kiptopeke State Park. During the fall of 1995, at the request of the Kiptopeke Environmental Station Research Education Laboratory (KESTREL Foundation), the first full-time hawk count was taken by a single trained observer. From August 15 to November 30, 1995 a total of 79,208 raptors of seventeen species were recorded during 966.5 hours of observation. In 1996, a total of 69,118 raptors were counted and recorded during 966.5 hours of observation between September 14 and November 30. Counts are conducted on a daily basis, except when precipitation or unfavorable winds were prevalent.

This project also supported an intern who served at the Passerine Banding Station at the Park, and provided regular and impromptu public information talks and demonstrations on the dynamics of passerine migration. Between September 1 and October 25, 1996, seven banders spent 651 hours during 52 days of operation banding 3360 birds of 83 species. These numbers were down from 1995 by 22% (3801) and 6% (88) in 1994. Hatching year and young of the year make up 87% of the birds handled. Six species of warblers are among the ten most commonly trapped birds.

More than 270 species of birds are recorded on the peninsula each fall. The purpose of these observations is to gather long-term data regarding the fall migration of raptors and migratory songbirds along the Atlantic Flyway of Virginia's Eastern Shore. This information is essential to the development of sound, comprehensive regional, national and international management plans. By establishing a long-term census project, populations and migratory trends can be assessed and monitored. The secondary purpose of the project is to provide public education concerning raptors and migratory songbirds, their migration, and usage of vital habitat found along the Eastern Shore. A report is available which provides a detailed summary and analysis of the 1995 and 1996 hawk counts and captures, and passerine banding results.

Northampton County  
Contact: Bill Williams, KESTREL Foundation,  
804.253.6779  
January 1996, February 1997  
1994 Task 2.10, 1995 Task 2.4



### Most Commonly Banded Bird Species 1996

Yellow-rumped Warbler	1113
American Redstart	354
Common Yellowthroat	253
Black-throated Blue Warbler	208
Gray Catbird	161
Western Palm Warbler	136
Yellow Palm Warbler	87
Red-eyed Vireo	86
Magnolia Warbler	62
Black and White Warbler	61

### TOTAL

\*(76% of all birds banded) 2521

\*NOTE: A total of 3,360 birds were banded representing 83 species

Source: 1997 Kiptopeke Banding Station Report.

### RAPTORS COUNTED 1996

Black Vulture	2630
Turkey Vulture	12417
Osprey	5775
Bald Eagle	354
Northern Harrier	1065
Sharp-shinned Hawk	23105
Cooper's Hawk	2511
Northern Goshawk	21
Red-shouldered Hawk	140
Broad-winged Hawk	3653
Swainson's Hawk	4
Red-tailed Hawk	2370
Rough-legged Hawk	0
Golden Eagle	32
American Kestrel	11331
Merlin	2282
Peregrine Falcon	1428

TOTAL 69118

Source: 1996 Cape Charles Raptor Research Station Annual Report



# Habitat & Wildlife Management



Artwork by Doreen Curtain

## **The Neotropical Migratory Songbird Coastal Corridor Study: Special Virginia Edition**

Repeated accounts of population declines for many neotropical migratory songbird species have awakened widespread concern and sparked national and international conservation initiatives. These birds, which summer in the northeastern U.S., "hopscotch" down the Atlantic coast each fall on their way to their winter grounds in the tropics. Two of the major "stopover areas" are the tip of Virginia's Eastern Shore and Cape May, New Jersey.

In the fall of 1991, this study examined the distribution and habitat associations of fall migrating land birds within the coastal regions of New Jersey, Delaware, Maryland and Virginia. The Virginia Coastal Program brought together The Nature Conservancy and each state's Natural Heritage Program to conduct the study. Each weekend, hundreds of volunteers counted birds across transects in the four state region. There were 487 survey sites and 12,000 point counts conducted August through October, resulting in a count of over 36,000 birds of 91 species.

The final report contains data tables as well as extensive recommendations for land managers and private landowners from a regional and state perspective. It also suggests native trees, shrubs and vines to be used in landscaping that would benefit the songbirds. Native plants, particularly dense understory shrubs, provide critical food cover during the stressful period of fall migration when birds need to store energy for their long flight. In addition, the Special Virginia Edition of the report contains a preliminary natural areas survey of Northampton and Accomack Counties.

*Virginia Coastal Program*

*Contact: Laura McKay, Department of Environmental Quality, 804.698.4323*

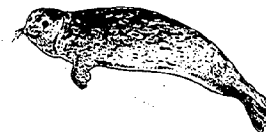
*August 1993*

*1990 Section 309 Interstate Award*





# Habitat & Wildlife Management



## Conservation Plan for Marine Mammals and Sea Turtles in Virginia

This project developed a comprehensive plan to conserve sea turtles and marine mammals in Virginia. The plan represents a cooperative private/public effort to identify, prioritize, and implement those steps necessary to conserve these species in Virginia. Team members included representatives from Virginia state agencies, federal agencies, educational institutions, and conservation groups. The plan focuses on the most commonly occurring species of marine mammals and sea turtles in Virginia, but encompasses all 35 species that have been recorded as live or stranded, since they share common life history and habitat needs while in Virginia waters. This includes five species of sea turtles and 30 species of marine mammals, 13 of these imperiled. VMRC, DGIF, VIMS, the U.S. Fish & Wildlife Service, and the National Marine Fisheries Service share responsibility for the protection and management of sea turtles and marine mammals in Virginia.

The four objectives of the plan are: 1) Protect, manage, and enhance sea turtle and marine mammal populations by assessing population status and trends as well as the life history needs of these species utilizing Virginia's waters. 2) Protect, manage, and enhance the habitats of sea turtles and marine mammals by identifying, documenting, and then minimizing impacts to their habitats and populations. 3) Identify and coordinate existing roles, responsibilities, and activities of the various parties and promote improved coordination. 4) Improve and promote education and public participation.

VIMS' and VDGIF's published article—**Swimming Beyond Boundaries: The Uncertain Future of Virginia's Marine Mammals and Sea Turtles**, *Virginia Wildlife*, January 1994—summarizes the results of the first phase of this project. Essential baseline status information was summarized and the group identified gaps in the data, such as seasonal distribution, abundance, and habitat utilization of sea turtles and mammals in the Chesapeake Bay and coastal waters. This article fulfilled the groups' goal to disseminate information learned and developed throughout the effort. A companion video was also produced.

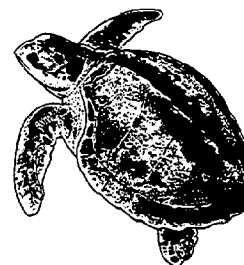
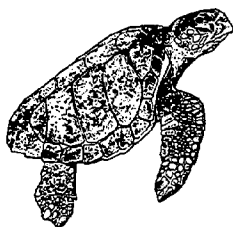
*Virginia Institute for Marine Science/Virginia Department of Game and Inland Fisheries*

Contact: Jack Musick, VIMS, 804.642.7317

or Ray Fernald, DGIF, 804.367.8364

January 1994

1993 Task 14



# Habitat & Wildlife Management

## Distribution of the Atlantic Bottlenose Dolphin in Virginia Tidal Rivers

This pilot project used volunteer networks to collect information on bottlenose dolphin (*Tursiops truncatus*) distribution from May through October in Chesapeake Bay tributary rivers (James, York, Piankatank, Rappahannock, Potomac) and the Eastern Shore. The primary observers were volunteer water quality monitors with the Alliance for the Chesapeake Bay. Volunteers were trained in survey protocol and given maps to plot dolphin sightings. Two aerial surveys were conducted to provide more complete coverage of Chesapeake Bay and river mouth shorelines.

Results of volunteer observations and aerial survey sightings were plotted using GIS. The total number of dolphins sighted ranged from 350-596 with a best estimate of 505. Despite difficulties calculating effort, the sighting data provide the first riverine bottlenose sightings recorded by trained observers in Virginia. A Bottlenose Dolphin Sightings Home Page has been designed by the Virginia Chesapeake Bay National Research Reserve ([http://www.vims.edu/cbnerr/teach/dolphome.htm](http://www.vims.edu/cbnerr/teach/dolphhome.htm)) which includes information from the study.

*Virginia Marine Science Museum/  
Virginia Department of Game & Inland Fisheries  
Contact: Mark Swingle or Susan Barco, VMSM,  
757.437.4949  
February 1997  
1994 Task 2.12*

❖

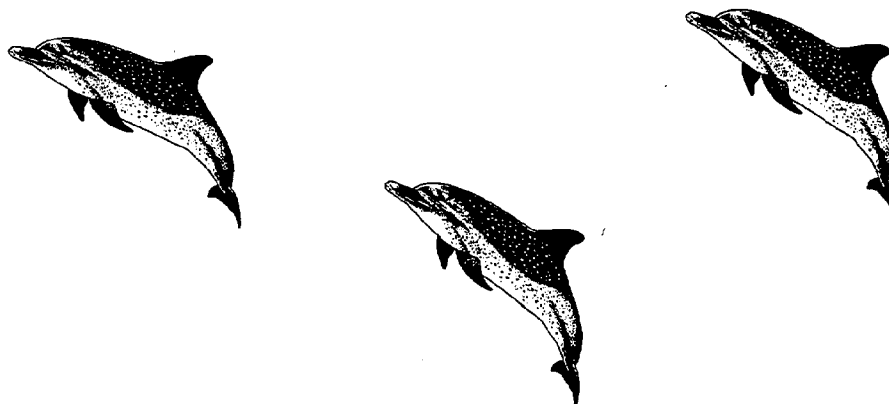
## Sighting Patterns of Coastal Migratory Bottlenose Dolphins in the Near Shore Waters of Virginia and North Carolina

The Virginia Marine Science Museum conducted a dolphin photo-identification and migration study in cooperation with researchers in North Carolina. Bottlenose dolphins (*Tursiops truncatus*) are considered depleted under the Marine Mammal Protection Act of 1994. These coastal migratory dolphins are only present for part of the year north of Cape Hatteras, occurring in the highest concentration on Virginia's coast in Virginia Beach from April to November. Dolphins in North Carolina are present year round south of Cape Hatteras.

Photo-identification is a technique that takes a "dorsal fin-print" of individual animals which aids researchers in identifying and tracking recognizable dolphins over time. Researchers from Virginia and North Carolina compared photographs of dolphins' dorsal fins taken in both states. Individuals were identified and matched. The resulting evidence supported the theory of relatively discrete migratory populations whose ranges overlap spatially but not temporally.

*Virginia Marine Science Museum  
Contact: Mark Swingle or Susan Barco, 757.437.4949  
November 1996  
1994, Task 77*

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# Habitat & Wildlife Management

## Management and Conservation of Sea

### Turtles in Virginia

The sea turtle research program at the Virginia Institute of Marine Science (VIMS) has served as the National Marine Fisheries Service Sea Turtle Salvage and Stranding Network (STSSN) for Virginia since 1979. As such, the VIMS program has in place an organized state stranding network comprised of about 100 cooperating individuals and agencies. When possible, dead stranded sea turtles are identified, measured, weighed, and examined externally for tags, unusual markings, and cause of death. Currently all sea turtle stranding data are collected and summarized by VIMS and data are analyzed for species composition and age class in the Chesapeake Bay, cause of death, and location of strandings. Any unusual stranding events are monitored and reported to NMFS. The project's final report contains bar graphs showing totals of strandings of dead sea turtles per month for Virginia in 1996, the length frequency of these turtles, and maps illustrating the location of sea turtle strandings in 1996. A total of 195 dead sea turtles were recorded in Virginia in 1996, including 176 loggerheads, 8 Kemp's ridleys, 5 leatherbacks, and 3 green sea turtles, and 3 turtles that were unidentifiable. Of the 195 dead sea turtles, 12 fatalities were from propeller wounds, 3 from gunshot wounds, 2 from net/fishing line entanglement and the remaining 178 fatalities were from unknown causes. During 1996, 2 sick loggerheads and 1 sick Kemp's ridley were treated, and only one was successfully rehabilitated. The two fatalities were caused by severe propeller wounds. Juvenile turtles from Virginia's waters are important to the continued existence of the species, as they will be recruited into the breeding population over the next few years.

*Virginia Institute of Marine Science*

*Contact: Jack Musick, 804.642.7317*

*February 1997*

*1994 Task 26*



*See Also:*

*Environmental Management, page 16*

*Mapping Distribution & Abundance of Sub-Aquatic Vegetation in the Chesapeake Bay and Virginia Tributaries*

*Special Area Management Plans, page 87:*

*Migratory Bird Habitat Public Education & Policy Development*

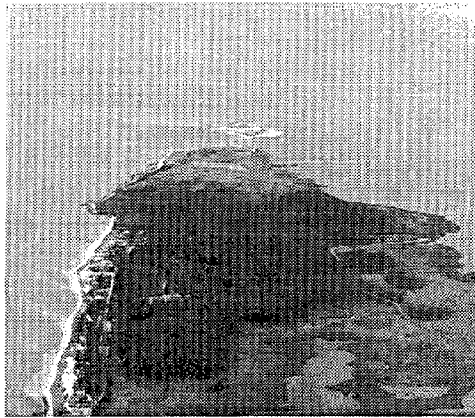
*Special Area Management Plans, page 88:*

*Northampton County Migratory Bird Habitat Utilization Study*

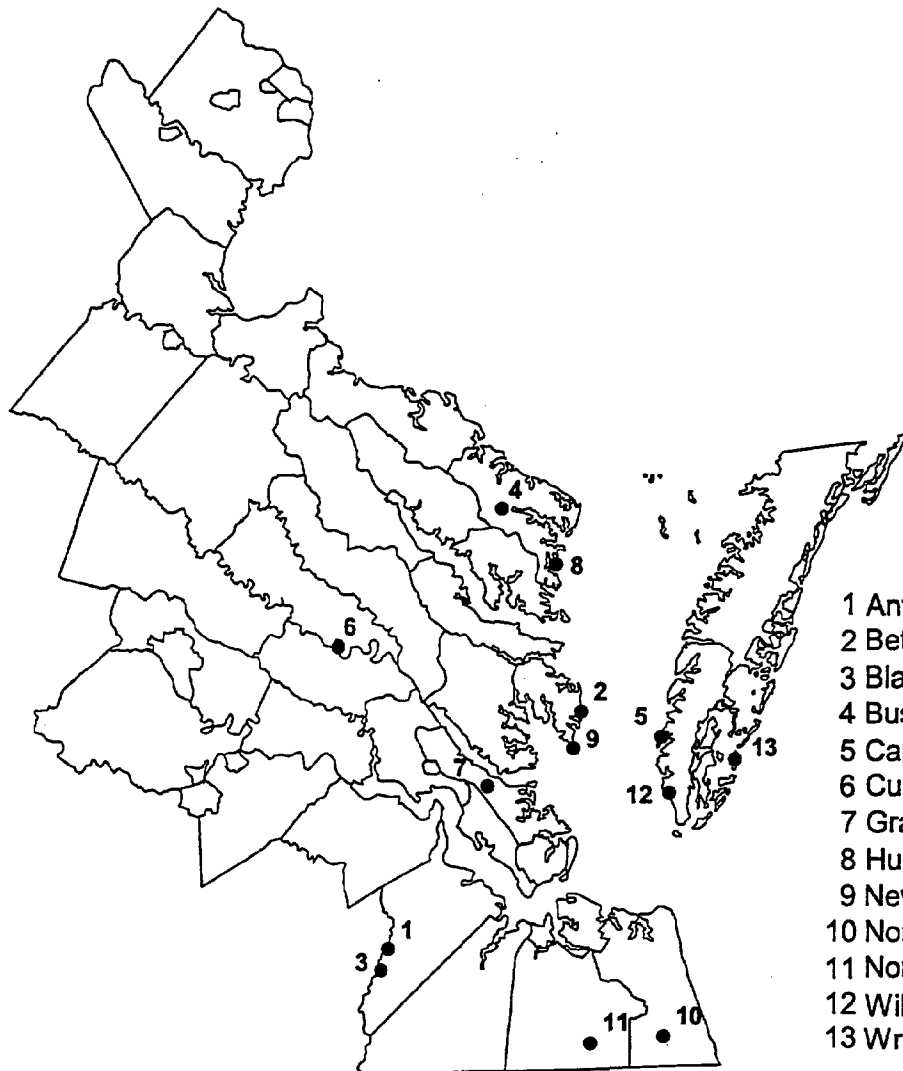
*Special Area Management Plans, page 88:*

*Barrier Island and Marsh Nesting Waterbird Survey*

# Land Acquisition

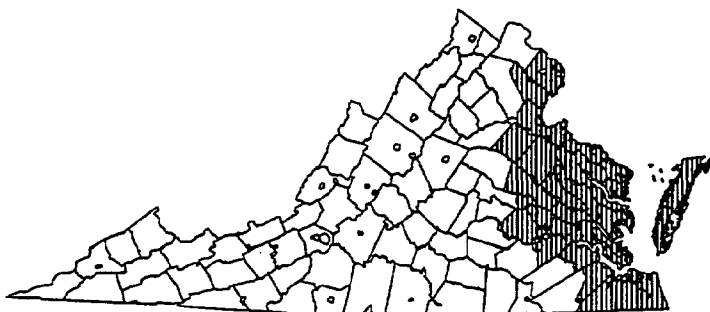


# Natural Area Preserves in Virginia's Coastal Zone



- 1 Antioch Pines
- 2 Bethel Beach
- 3 Blackwater Ecological Preserve
- 4 Bushmill Stream
- 5 Cape Charles Coastal Habitat
- 6 Cumberland Marsh
- 7 Grafton Ponds
- 8 Hughlett Point
- 9 New Point Comfort
- 10 North Landing River
- 11 Northwest River
- 12 William B. Trower Bayshore
- 13 Wreck Island

40 0 40 Miles



Virginia Coastal Zone

## Land Acquisition

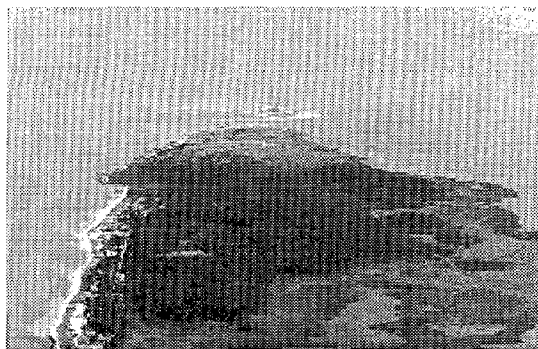


Photo by Al Carpenter

### New Point Comfort: Mathews County

New Point Comfort in Mathews County contains primary and secondary dunes as well as mixed deciduous/pine forested wetlands and saltmarshes, creating a marvelous ecotone from Chesapeake Bay to Mobjack Bay. The point provides breeding habitat for the federally endangered Northeastern Beach Tiger Beetle and feeding habitat for the federally threatened Least Tern. River otters are also seen in this area. The purchase of this 95 acre site complements the conservation work already accomplished by the Virginia Department of Conservation and Recreation, Natural Heritage Program, and The Nature Conservancy at nearby Bethel Beach. Both New Point Comfort and Bethel Beach are dedicated by the Natural Heritage Program as State Natural Area Preserves. The relatively accessible nature of the site provides excellent opportunities for nature activities and interpretive areas.

A boardwalk on the Mobjack Bay side of New Point Comfort has recently been constructed with funds provided to Mathews County by the Virginia Coastal Program (see project list for 1995 task 68).

*The Nature Conservancy, Virginia Chapter*  
Contact: Linda Lundquist-Crowe, 804.295.6106  
July 1994  
1992 Task 23



### Alton's Creek: City of Virginia Beach

#### *North Landing River Natural Area Preserve*

This project involved the purchase of 45 acres of land adjacent to the North Landing River Natural Area Preserve in Virginia Beach by the Natural Heritage Program at the Department of Conservation and Recreation. The acquisition provides a site for access to the North Landing River Natural Area Preserve which was otherwise not accessible, due to a lack of road frontage on the preserve. The property was purchased in January 1994, and has been dedicated into the Virginia Natural Area Preserve System. The tract has frontage on Blackwater Road to the west, and frontage on Alton's Creek, a tributary of the North Landing State Scenic River. The property acquired through this grant supports upland mesic forest and swamp, and provides habitat for the rare Dismal Swamp southeastern shrew, canebrake rattlesnake and silky camelia.

*Virginia Department of Conservation and Recreation*  
Contact: Larry Smith, 804.786.7951  
January 1994  
1992 Task 22



*See Also: Public Access, page 52 -  
North Landing River Area Preserve/Alton's Creek  
Boardwalk*

### Jones Creek: Isle of Wight County

This project involved the purchase of four acres of land on Jones Creek located in Newport District, adjacent to seven acres of land currently owned by the County of Isle of Wight. The land was purchased by the County for the development of a public boat ramp.

*Isle of Wight County*  
Contact: 804.357.3191  
October 1992  
1991 Task 57



*See Also:  
Public Access, page 55 - Jones Creek Boat Ramp*

# Land Acquisition

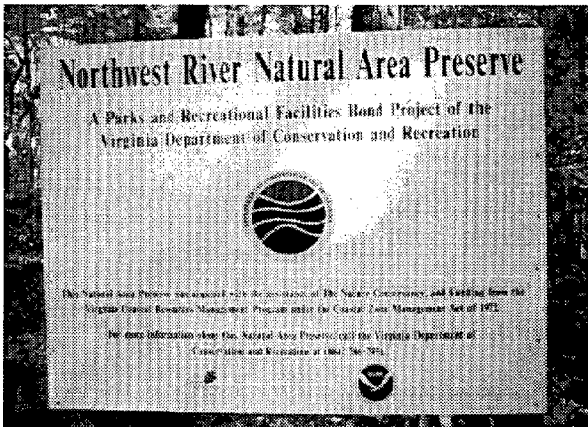


Photo courtesy of the Department of Conservation & Recreation

## Northwest River: City of Chesapeake

### ***Northwest River Natural Area Preserve***

This project involved purchase of a significant natural area on the Northwest River in the City of Chesapeake. This 926.23-acre tract, formerly known as the McAlpine Tract, was dedicated as part of the 2258 acre Northwest River Natural Area Preserve in 1995. This tract is home to rare species, including the federally threatened Dismal Swamp southeastern shrew, the state endangered canebrake rattlesnake, and rare plants including the silky camelia and Carolina boltonia. The tract also supports a narrow fringe of fresh water wind tide marsh along the Northwest River and extensive forested wetlands and upland hardwood forest.

*Virginia Department of Conservation and Recreation*  
Contact: Larry Smith, DCR-Division of Natural Heritage,  
804.786.7951  
October 1995  
1993 Task 7.1  
❖

## Northwest River: City of Chesapeake

### ***Northwest River Natural Area Preserve***

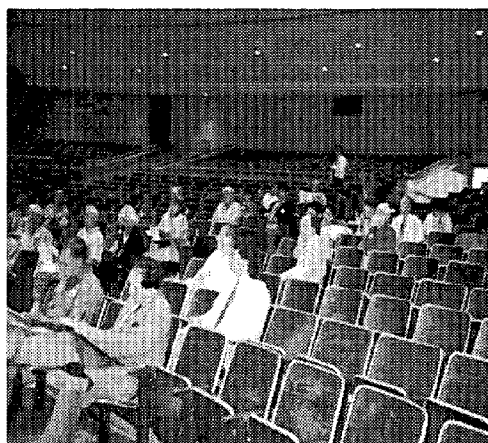
This project involved the purchase of privately-held timber rights on a 415-acre tract acquired by the Virginia Department of Conservation & Recreation (DCR) in January of 1995 for inclusion within the Northwest River Natural Area Preserve. The tract, the John D. Maxey Tract is located along the Northwest River in southeastern Virginia on the Virginia-North Carolina border. The tract supports an impressive, high quality stand of mature pine-hardwood forest dominated by loblolly pine, red oak, tulip-tree, and white oak, which have been largely undisturbed. The purchase of this upland timber will offer habitat protection to the state endangered canebrake rattlesnake.

This project also provided funding for improvement of the public access road leading into the Maxey Tract, which is used for guided field trips sponsored by DCR, staff from the nearby Northwest River Park (owned by the City of Chesapeake), and other environmental education groups. The road also provides access to the tract by researchers and site managers.

*Virginia Department of Conservation and Recreation*  
Contact: Larry Smith, 804.786.7951  
May 1996  
1994 Task 7.1  
❖

See Also:  
Special Area Management Plans, page 92 -  
*Virginia Seaside Farms: A Conservation Easement*  
*Program in Northampton County*

## **Local Government Planning/Comprehensive Plans**





# Local Government Planning/Comprehensive Plans

## Accomack County Proposed Zoning Amendments

This project involved the development of Zoning and Subdivision ordinance amendments designed to implement the goals, objectives, and policies set forth in the 1989 Comprehensive Plan of Accomack County. The intention of the amendments is to facilitate the creation of a convenient, attractive, and harmonious community, and address the long-range plans for future development of the county. "Site Development Plan" regulations were proposed in additional zoning amendments funded in 1991 to encourage efficient use of land, and ensure that land will be used in a manner which is harmonious with neighboring properties and protects the natural environment and its resources.

*Accomack County*  
Contact: Sandy Manter, 757.787.5726  
October 1991  
1990 Task 51, 1991 Task 51



## Accomack County Comprehensive Plan

This project involved the revision of Accomack County's Comprehensive Plan to include topics not addressed or inadequately addressed in the county's previous comprehensive plan. The revision process emphasized public participation and consensus building. Citizen advisory committees were formed to identify issues of local concern and a newspaper survey was published to gauge citizen opinion on these issues. A professional facilitator was hired to conduct a series of public forums on the future of agriculture, the seafood industry, and waterfront development. A vision statement for Accomack County and maps showing preferred patterns of development were drafted during the public forums. The advisory committee recommendations, newspaper survey results and vision statements served as a basis for a draft revised comprehensive plan. The draft plan was distributed to all interested parties and presented at public meetings and hearings for comment. The revised plan, adopted by the County's Board of Supervisors in 1997, addresses point and non-point source pollution control, habitat management, shoreline erosion management, public waterfront access, and fisheries management.

*Accomack County*  
Contact: Sandy Manter, 757.787.5726  
May 1997  
1995 Task 54



## Town of Nassawadox Zoning Ordinance

The regulations put forth in this document are part of a comprehensive and long-range program to guide and facilitate the orderly and economic growth of the community; and to promote the health, safety, and general welfare of the town's citizens.

*Accomack-Norhampton*  
Planning District Commission  
Contact: Jim McGowan, 757.787.2936  
December 1992  
1991 Task 38  
(Coastal Technical Assistance Program)



## Help Determine the Future of Accomack County !



**RESPECTING the PAST - CREATING the FUTURE**  
ACCOMACK COUNTY CITIZENS FORUMS

## Environmental Inventory and Land-Use Permitting/Tracking System

In this project, Accomack County expanded its environmental mapping system to include digitized tax parcel maps to include most of the environmentally sensitive lands in the County. The expansion of the system was made to facilitate and enhance review of development proposals and permit applications, and provide better analysis for rezoning decisions, especially in relation to the type and extent of development in coastal and other sensitive areas. Digitized maps include: special flood hazard areas, well-head protection areas, farm parcels in the Chesapeake Bay Protection Area, conservation priority areas, and septic systems.

*Accomack County*  
Contact: Sandy Manter, 757.787.5726  
February 1994  
1992 Task 5.3



# Local Government Planning/Comprehensive Plans

## Appomattox River Corridor Study

The Appomattox River is a major tributary of the James River. It flows in an easterly direction across the Piedmont and Coastal Plain of south-central Virginia from the confluence of the James and Appomattox Courthouse in Hopewell. This study documents the natural, scenic, historic, and man-made features of the river. Its purpose is to establish a regional database to help coastal planners and decision makers understand the complex nature of managing the river's resources, and support the creation of innovative solutions which can balance competing interests and protect valuable resources.

Phase I of the project was completed in 1993. It inventoried recreation and riverfront features such as river access, parks and recreation, as well as wildlife and natural areas. A total of 23 existing and potential public access sites were identified. Phase II of the study examined existing and future land use information, zoning, ownership patterns, water and sewer utilities, as well as soils and mineral resources. Phase III of the study addresses water quality issues policies, recent improvement efforts, and state and federal water quality regulations and programs.

*Crater Planning District Commission*

*Contact: Victor Liu, 804.861.1666*

*September 1995*

*1992 Task 35, 1993 Task 35, 1994 Task 35  
(Coastal Technical Assistance Program)*



## Essex County Comprehensive Plan

This plan provides the basic policy framework to manage and direct future development in Essex County. It is designed to address the county's needs through the year 2010, thus providing a means to ensure orderly, managed growth and development.

*Essex County*

*Contact: 804.443.4331*

*November 1991*

*1990 Task 53*



## Northern Neck Land Use Tracking and Mapping System

The Northern Neck Planning District Commission developed a system of database programs designed to aid county officials in regulatory and land use planning. The system uses the most accurate records of past and present coastal development available and includes seven databases: a central database of tax map information; a septic database; a wetlands database; an erosion and sediment control database; a building permits database; an inspection database; a securities database, which includes bond provisions associated with building permits; and a zoning database. The County is currently developing an ArcInfo GIS system. The database system will continue to serve as an important tool in managing and protecting the natural resources of the Northern Neck until the new GIS system is in place. Reports detailing the development and implementation of the database system are available.

*Northern Neck Planning District Commission*

*Contact: Fraser Picard, 804.529.7400*

*November 1991, February 1993*

*1990 Task 33, 1991 Task 63*

*(Coastal Technical Assistance Program)*



## Gloucester County Creative Rural Development Program

This program specifically addresses rural development occurring outside targeted growth areas to encourage clustering, preservation of open space systems, and preservation of native vegetation as an integral part of development design. A manual was produced describing a package of ordinance revisions designed to manage rural development. Changes were needed to various sections of the Gloucester County Zoning Ordinance and Subdivision Regulations to implement the new rural zoning districts identified in the Comprehensive Plan updated in 1991.

*Gloucester County*

*Contact: Jeff Haugbney, 804.693.4040*

*November 1994*

*1993 Task 55*



# Local Government Planning/Comprehensive Plans

## Buffer-Impaired Stream Segments in the Northern Virginia Coastal Zone

As part of its technical assistance grants, the Northern Virginia Planning District Commission coordinated and enlisted the help of volunteers to reforest denuded buffer areas along streams, wetlands and other water bodies in the planning district. A "Lessons Learned" report was written which describes the process developed by NVPDC to organize and establish a framework for promoting volunteer effort in a regional reforestation program.

The NVPDC developed a two-phase Riparian Restoration Analysis Initiative as a subproject of their 1993 and 1995 Technical Assistance grants. The goal of this initiative program was to help localities and local organizations identify riparian restoration opportunities. In Phase I, impaired buffer systems were identified using aerial photography and analyzed for restoration potential. All riparian segments within the planning boundaries were considered for restoration potential, including tidal portions of the Potomac River. Stream segments were defined as "buffer-impaired" when review of photographs indicated limited, or complete absence of, woody vegetative cover within the 100-foot buffer designated Resource Protection Areas required under the Chesapeake Bay Preservation Act. In some cases, stream segments were examined beyond these designated areas. A map was produced identifying potential target sites for revegetation/reforestation activities.

During Phase II, the map was digitized for use with NVPDC's Geographic Information System (GIS) system. Buffer-impaired stream segments were matched with different land uses already identified on NVPDC's GIS. The areas with the greatest potential for buffer restoration, generally those on publicly owned lands, were identified. The final map has been made available to Northern Virginia localities and local organizations involved in riparian restoration efforts.

*Northern Virginia Planning District Commission  
Contact: David Bulova, 703.642.0700  
September 1992, 1994, 1996  
1991 Task 31, 1993 Task 31, 1995 Task 31  
(Coastal Technical Assistance Program)*



## Richmond County Land Management Ordinance

This ordinance was adopted to guide development in Richmond County in accordance with the County's existing and future needs, while also improving the public health, safety, convenience, and welfare of the County's citizens.

*Richmond County  
Contact: Bill Duncanson, 804.333.3415  
December 1991  
1990 Task 61*



## Discussion Paper: Transferable Development Rights in Northern Virginia

Transferable Development Rights (TDRs) is a planning concept that offers a potentially effective tool to localities that want to protect valuable coastal and natural resource areas by focusing growth in urban areas and along transportation corridors.

NVPDC's discussion paper on transferable development rights traces the legislative history of TDRs and details the important issues surrounding the concept as described by various interest groups. The discussion paper outlines specific examples from existing programs where TDRs have proven successful and where TDRs have fallen short of their full potential.

*Northern Virginia Planning District Commission  
Contact: David Bulova, 703.642.0700  
November 1993  
1992 Task 31  
(Coastal Technical Assistance Program)*



# Local Government Planning/Comprehensive Plans

## Richmond Regional Environmental Goals, Objectives and Policies

This report outlines a set of goals, objectives and policies developed by the Planning District Commission as a framework for commission discussion of regional environmental issues and actions, and a framework for environmental program development and preparation of detailed environmental plans and studies. The report also serves as a reference tool for member governments preparing local environmental plans and studies.

*Richmond Regional Planning District Commission*

*Contact: Larry McCarty, 804.358.3684*

*December 1993*

*1991 Task 34*

*(Coastal Technical Assistance Program)*



## King George County Comprehensive Plan

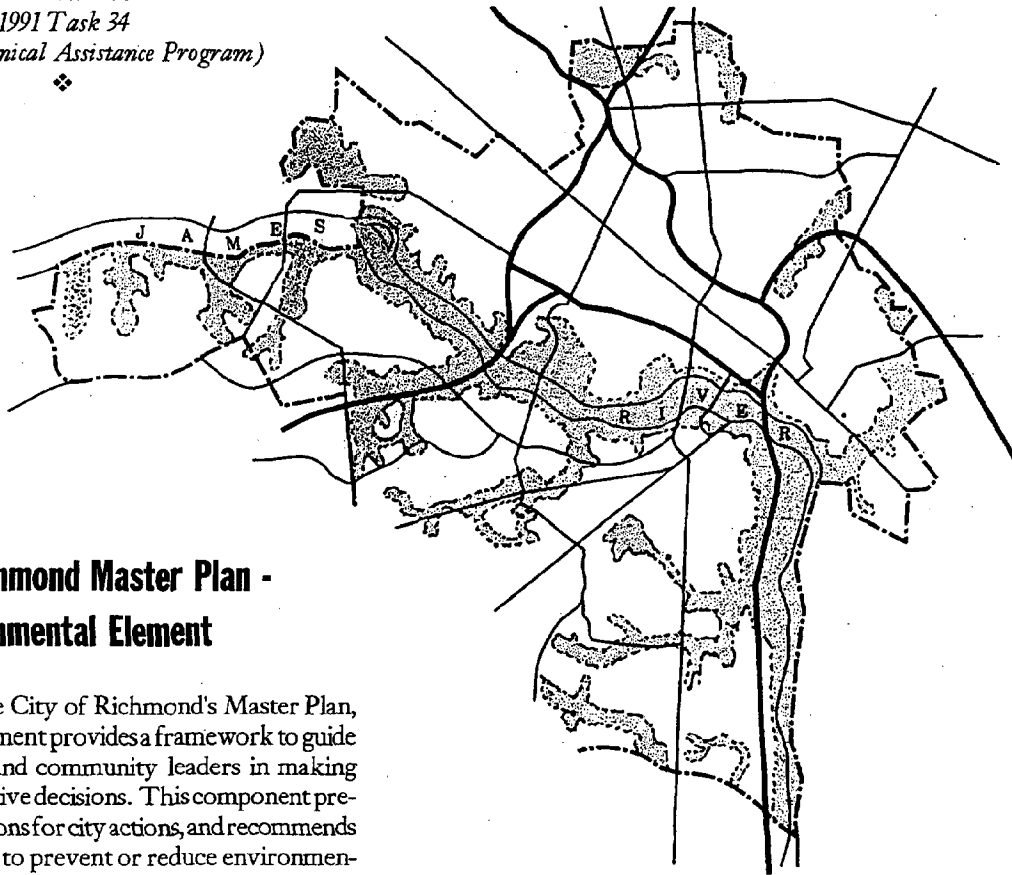
The document presents a general, long-range comprehensive plan for development in King George County. The County's previous comprehensive plan was adopted in October of 1984.

*King George County*

*Contact: 703.775.7111*

*December 1991*

*1990 Task 32*



## City of Richmond Master Plan - Environmental Element

As a component of the City of Richmond's Master Plan, the Environmental Element provides a framework to guide businesses, residents, and community leaders in making environmentally-sensitive decisions. This component presents policies and directions for city actions, and recommends projects and programs to prevent or reduce environmental degradation.

*City of Richmond*

*Contact: Heather Mackey, 804.780.6310*

*February 1992*

*1990 Task 60*



# Local Government Planning/Comprehensive Plans

## Unregulated Dams in Charles City and New Kent Counties

Small dams that are not regulated by the state far outnumber those that are regulated. Small dam owners and local staff are largely on their own when seeking information on construction and maintenance of small unregulated dams. Working with Charles City County, New Kent County, and the Department of Conservation & Recreation, Richmond Regional Planning District Commission staff inventoried and inspected selected dams in both counties, and collected construction and maintenance information. A dam assessment procedure was developed for use by local governments, who will work with dam owners to take appropriate action when necessary to eliminate potential problems which can lead to dam failure.

*Richmond Regional Planning District Commission*  
Contact: Larry McCarty, 804.358.3684  
November 1993  
1992 Task 34  
(Coastal Technical Assistance Program)



## Chesapeake Bay Protection Act Comprehensive Plan Consistency Issues

The City of Richmond contracted with the Richmond Regional Planning District Commission and the Chesapeake Bay Local Assistance Department for assistance in reviewing the city's Chesapeake Bay Program. This project addressed six comprehensive plan consistency issues. Master Plan Environmental Element text amendments were drafted on two issues: streambank erosion and waterfront public access. Discussion papers regarding water quality improvement alternatives for intensively developed areas, and potential impacts to water quality of existing and potential land uses in the floodplain area east of Interstate 95 and south of the James River were produced. Portions of these text amendments and discussion papers will be incorporated into the comprehensive update of the city's Master Plan.

*City of Richmond*  
Contact: Heather Mackey, 804.780.6313  
October 1996  
1995 Task 56



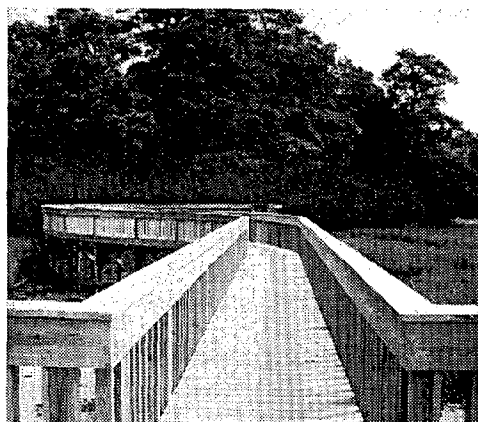
## Chesterfield County Flood Hazard Mitigation Study

Flood damage to structures built within floodplains results in annual losses in the millions of dollars. The prevention of this type of damage is key to reducing losses. As part of its technical assistance award from the Coastal Program, the Richmond Regional Planning District Commission, working with the Department of Conservation & Recreation (DCR) and Chesterfield County, assessed flood hazards for the county using a methodology developed by DCR. The results of the assessment are contained in this report. While this assessment procedure has been used in rural areas, this marked the first use of the procedures in a suburban setting. The procedure is useful to local jurisdictions assessing potential flood damage and will help them qualify for federal and state funding designed to eliminate flood hazards.

*Richmond Regional Planning District Commission*  
Contact: Larry McCarty, 804.358.3684  
November 1993  
1992 Task 34  
(Coastal Technical Assistance Program)



## **Public Access: Plans & Construction**



## Public Access: Plans & Construction



Photo courtesy of Virginia Coastal Program, DEQ

Boardwalk at Kiptopeke State Park



Photo courtesy of Virginia Coastal Program, DEQ

Hawk Observatory at Kiptopeke State Park

### Kiptopeke State Park Boardwalk and Hawk Observatory

This project provided for the construction of handicapped-accessible elevated boardwalks, observation areas, a beach bathhouse and interpretive exhibits, while ensuring the protection of the coastal forest and dune system on the southern tip of Virginia's Eastern Shore.

Three elevated boardwalks, approximately 1,450 linear feet, provide environmentally safe access from the high bluffs of the park to the shore of the Chesapeake Bay. They are designed with an elevation drop of 40-50 feet. The boardwalks cross approximately 150 yards over a dune and dune grass system, their zigs and zags deftly avoiding rare plants. Two of the boardwalks are designed to be handicapped-accessible. These boardwalks help protect over 80 acres of coastal dune system, and provide birdwatchers access to a coastal forest important to migratory neotropical songbirds and birds of prey.

As a result of this project, excellent access facilities were provided from the picnic area and natural area to the shore of the Bay. The structures provide viewing areas of the Bay and interpretive signage, thus enhancing the experience of the park visitor. They also prevent the bank erosion and dune destruction which would have occurred if the public had made its own way to the beach.

The handicapped-accessible hawk observatory is also extremely popular, and not only used by the general public, but also during the migration season for scientific study and during special educational events.

*Virginia Department of Conservation and Recreation*

*Contact: John Davy, 804.786.1119*

*April 1994*

*1992 Task 21*



## Public Access: Plans & Construction

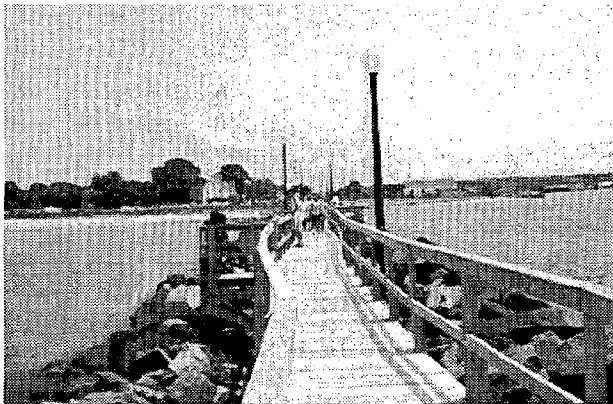


Photo courtesy of Virginia Coastal Program, DEQ

### Cape Charles Jetty Pier

The Jetty Pier, located in the Town of Cape Charles on the lower, bayside of the Eastern Shore, is a timber walkway constructed on concrete footings along an existing riprap and fill jetty. Historically, the rock jetty had been used by the railroad to park sleeping cars at night, so the passengers could hear the waves as they slept. In more recent years, the riprap jetty was used by the public for water access, which was especially dangerous when the rocks were wet and slippery. The jetty now provides safe public access for fishing and viewing the Chesapeake Bay.

A subsequent Coastal Program grant provided for enhancements to the area immediately surrounding the pier. Electricity was brought out to the pier and turn-of-the-century lamp posts were installed along both sides of the walkway. In addition, play equipment was installed on the beach adjacent to the pier, and plants native to the Bay were located near the pier's entrance. A third grant was awarded to expand upon the native species planting. An attempt was made to reestablish dune grasses and screen an adjacent sewage treatment building.

#### *Town of Cape Charles*

Contact: Jeannie Lewis Butler, Virginia Coastal Program,  
804.698.4333

Jetty Pier Completed in 1994  
1992 Task 52, 1993 Task 53, 1994 Task 2.6



### Dune Crossovers for Public Access in the Town of Cape Charles

This project funded the construction of two dune crossovers for public beach access in the Town of Cape Charles on Virginia's Eastern Shore. The two crossovers are handicapped-accessible and include a deck platform overlooking the Chesapeake Bay. These crossovers eliminate the need for foot traffic to cross directly over the dune. The former foot paths will be blocked with snow fences to protect the dune from further deterioration, and revegetated with dune grasses. This project also included the construction of an information kiosk.

#### *Northampton County*

Contact: Tim Hayes, 757.687.0477

February 1997

1994 Task 68



Photo courtesy of Northampton County

A previously man-made path, which will be revegetated, runs parallel to one of the Town's new dune crossovers.



# Public Access: Plans & Construction

## Town of Wachapreague Harbor Improvements

This project provided for construction of an environmentally compatible public boat ramp and parking facilities in a new commercial and recreational harbor in the Town of Wachapreague. Not only has the provision of a boat ramp provided public recreational access to the coastal bays and estuaries on the Atlantic side of the Eastern Shore, but it has also aided in the revitalization of a deteriorating commercial waterfront. The town's harbor provides a dock, piers, slips, and sanitary and electrical services.

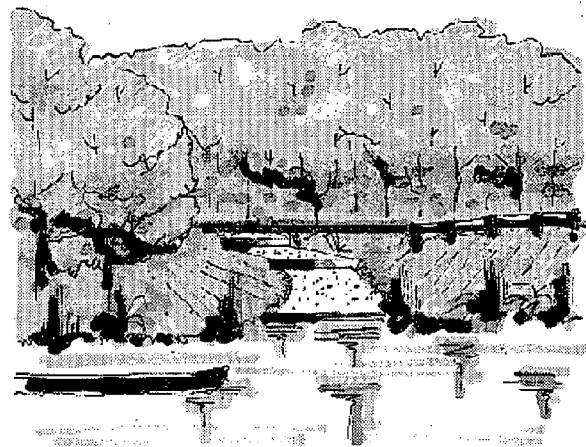
The boat ramp is an eighty-foot long, 30-foot wide, concrete ramp with the capacity to launch two vessels simultaneously. A five-foot wide pier was constructed adjacent to the boat ramp to ease launching. A 120-foot bulkhead was constructed on the southern edge of the boat ramp to prevent sedimentation of the ramp. Lastly, a 4,800-square-foot parking lot was constructed with pervious surface materials that will prevent stormwater runoff to coastal waters.

A kiosk, signage and displays were also funded in order to provide information on the harbor, fishing and boating regulations, surrounding natural areas, and conservation practices.

*Town of Wachapreague*  
Contact: F.L. Wallace, Mayor, 757.787.8668  
August 1995  
1993 Task 66



Photo courtesy of Town of Wachapreague



## Public Access & Visual Assessment of the North Landing River

The purpose of this study was to evaluate the North Landing River and its tributaries for potential public access opportunities and to identify important visual components of the waterway. This study was conducted in response to a growing demand for additional access to water and natural environments in Virginia Beach. In providing public access on the North Landing River, it is important to consider both active and passive recreation opportunities which are appropriate to the sustainability of the site.

This report identifies the resources of the region and makes recommendations for maintaining and enhancing the public access and visual components of the North Landing River and its tributaries. Areas which are subject to visual intrusion are described by river reach. The study identifies specific locations and proposes specific projects which could provide a more comprehensive approach to public access, and also identifies opportunities for implementation, potential cooperative initiatives, and funding options.

*Virginia Department of Conservation and Recreation*  
Contact: John Davy, 804.786.1119  
March 1994  
1994 Task 28



See Also: Land Acquisition, page 37:  
*Alton's Creek: City of Virginia Beach/North Landing River  
Natural Area Preserve*

# Public Access: Plans & Construction

## North Landing River Area Preserve/Alton's Creek Boardwalk

This project provides pedestrian access from an interior parking area across alternating sections of upland forest and swamp to a viewing deck/canoe launch on Alton's Creek. It also permits canoeists and kayakers to further explore the 10,000 acres of this preserve via the channels of Alton's Creek. A total of 895-feet of boardwalk—three swamp crossings, an observation spur, and viewing deck/canoe launch—was constructed. The boardwalks skim just 12-15 inches above the surface of the swamp. The low, open construction is visually unobtrusive, and permits the visitor to explore these wetlands with as few barriers as possible. This design is also an advantage to visitors carrying canoes or kayaks to the launch area.

All of the lumber used for this project was recycled plastic, which provides a number of advantages in this environment: 1) rot resistance (product is guaranteed for 50 years against rot); 2) resistance to the growth of algae, i.e., less slippery than wood in moist conditions; 3) no preservative leachate CCA (chromium, copper, and arsenic); 4) resistance to vandalism by carving or spray painting; 5) a very quiet walking surface as compared to wood. Because recycled plastic lumber is considerably less rigid than conventional wood lumber, this project was "overbuilt" to compensate. Posts (4" X 4") were driven with a sledge hammer at intervals of approximately 5' - 6' in every direction. Two (2" X 8") crosspieces were through-bolted to each pair of posts. The decking was constructed of 2" X 6" lumber. Fasteners were 1/2" carriage bolts of varying lengths, and galvanized nails. Because plastic lumber is difficult to nail, a nail gun was used to fasten decking to stringers.

*Virginia Department of Conservation and Recreation*

*Contact: Larry Smith, 804.371.6205*

*August 1996*

*1994 Task 28*



*See Also: Land Aquisition, page 37:  
Alton's Creek: City of Virginia Beach*



Photo courtesy of DCR

North Landing Preserve/Alton's Creek Boardwalk -  
completed

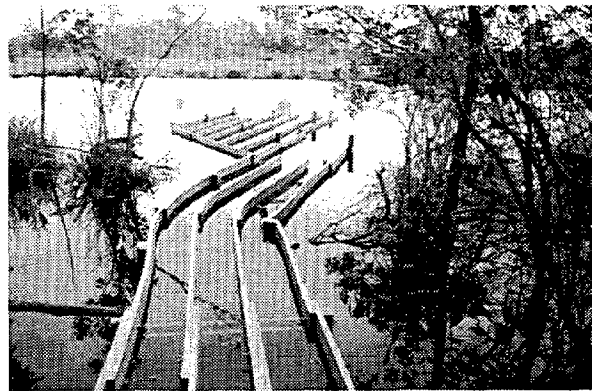
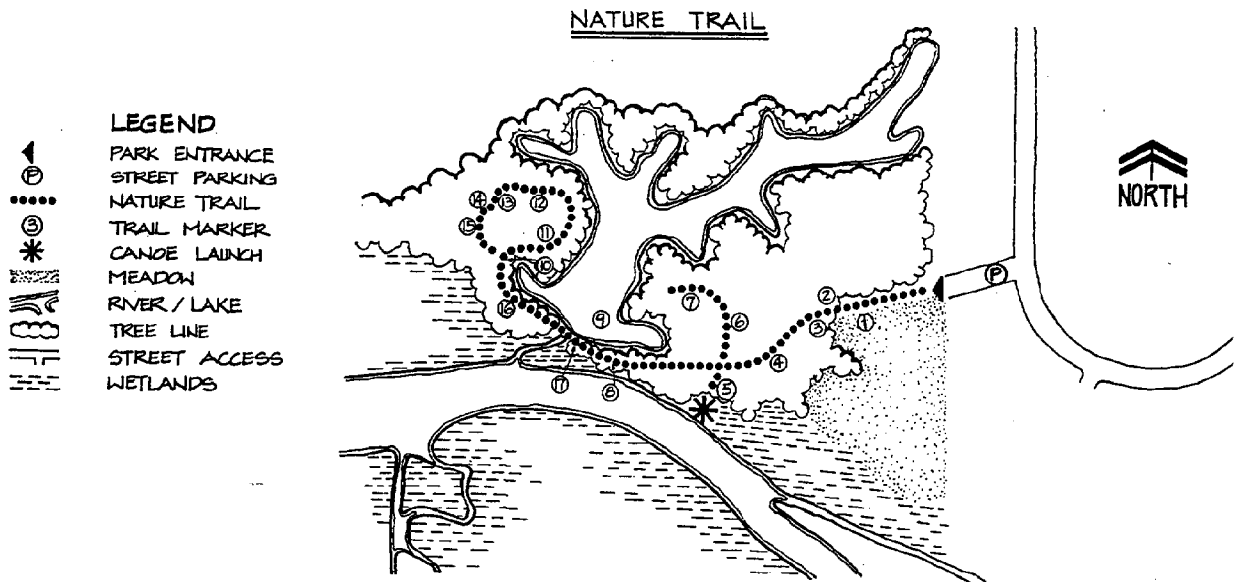


Photo courtesy of DCR

North Landing Preserve/Alton's Creek Boardwalk -  
under construction

# Public Access: Plans & Construction



## Elizabeth River Nature & Canoe Trail

The Elizabeth River Nature and Canoe Trail offers one mile of walking and two miles of paddling through tidal and freshwater marshes. Highlighting the unique natural and cultural history of the headwaters of the Elizabeth River, the interpretive trail is located in the Carolanne Farm Neighborhood Park, one of the last remaining undeveloped natural areas in a heavily populated area of Virginia Beach. Funding was provided for the design and construction of the trail and canoe launch. A 56-page interpretive trail guide was also published. Numerous volunteers from the adjoining community assisted in the construction of the trail and launch site. Future plans for the trail include construction of a waterfowl observation platform, designation as a part of the City's Scenic Waterway System, and restoration of tidal wetlands and forested buffers adjoining the trail site.

*City of Virginia Beach*  
 Contact: Clay Bernick, Environmental Management Center,  
 757.427.4621  
 June 1995  
 1993 Task 65

## West Neck Creek Nature & Canoe Trail

This project funded the design and construction of an interpretive nature and canoe trail in West Neck Creek District Park, an undeveloped city park in Virginia Beach. This park is located in a rural area of the city on West Neck Creek, which empties into the North Landing River. This project complements and forms a portion of a larger passive recreational park currently being planned by the City for an adjoining area. A trail guide was produced which highlights the unique ecological setting of the trail. Future plans for the trail include developing increased interpretive opportunities in conjunction with the nearby North Landing River Natural Area Preserve.

*City of Virginia Beach*  
 Contact: Clay Bernick,  
 Environmental Management Center, 757.427.4621  
 September 1996  
 1994 Task 65

## Public Access: Plans & Construction

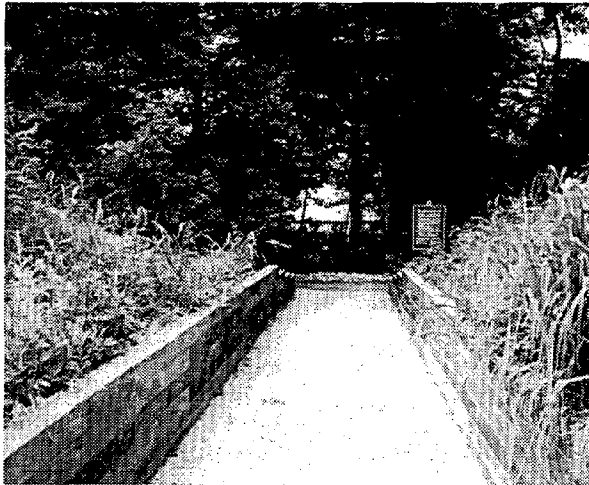


Photo courtesy of City of Newport News

View of a portion of the Riverview Farm Park trail flanked on either side by a meadow of wildflowers.

### King Lincoln Park Beach Replenishment

King Lincoln Beach is located on the Hampton Roads Waterfront of King Lincoln Park in Newport News. The beach before replenishment was too steep, narrow and rocky to accommodate large numbers of people for swimming and other water-related activities. Coastal Program funds were spent on delivery, placement, screening and stabilization of beach sand. This project created a wider beach with a veneer of high quality beach sand, the creation of low dunes to prevent erosion of the park area, native dune planting to stabilize the dunes, and opportunity for park interpreters to explain to the adjacent residents the workings of a tidal beach. The dunes and beach have stabilized and the dune grasses have been growing quickly.

*City of Newport News,  
Contact: Kristine Hall, Department of Planning &  
Development, 804.247.8761  
December 1995  
1994 Task 60*



### Riverview Farm Park Boardwalk

In order to enhance public access to the waterfront at Riverview Farm Park, the City of Newport News, extended an interpretive trail funded in 1991 (Task 61) with a 275-foot boardwalk over a saltwater marsh, terminating at a platform overlooking the James River. The boardwalk has greatly enhanced the interpretive features of the trail by increasing the visitor's view of a saltmarsh habitat, and a narrow sand-spit buffering the marsh from the River, helping to demonstrate the delicate ecological balance of the site. It also provides a beautiful panoramic view of the River. An interpretive plan for the park was also developed as part of the city's 1991 grant which includes outdoor and indoor exhibits, an interpretive center and nature programs, and interpretive signage. Other plans for the 300 acre park include an athletic and picnic areas, and a working farm. Archaeological digs will also be conducted on the site of Warwick Town, a historical site in the park.

The boardwalk receives frequent use from visitors to the Park. A wildflower meadow has also been planted along part of the interpretive trail entering the boardwalk.

*City of Newport News  
Contact: Michael Poplawski,  
Department of Parks, Recreation & Tourism, 757.926.8451  
March 1993, September 1994  
1991 Task 61, 1993 Task 60*

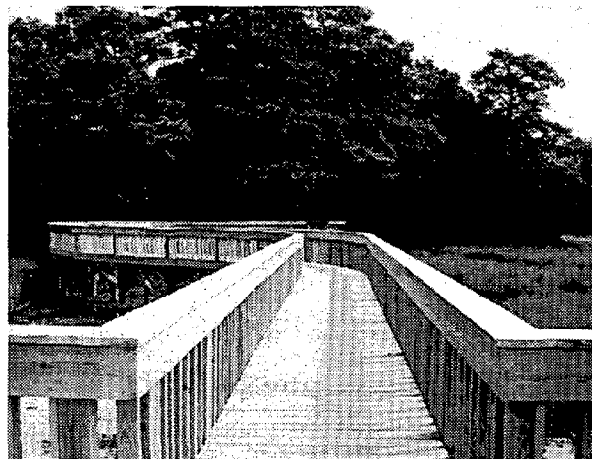


Photo courtesy of City of Newport News

View of Riverview Farm Park boardwalk offering a panoramic view of a saltwater marsh habitat and the James River.

## Public Access: Plans & Construction

### Monkey Bottom Wetland Walkway

An elevated wetland walkway and observation platform were constructed at the man-made Monkey Bottom wetland located at the city's visitor information center at Willoughby Bay. The walkway and observation platform provide safe, convenient public access to the largest man-made wetland in the city of Norfolk, extending 100 feet into the wetland. Interpretive signage on the platform describes the construction of the wetlands by the Navy in 1985, and the importance of the Monkey Bottom wetland as a nursery and foraging area to many species of fish and birds. This project demonstrated a successful partnership between the city, the U.S. Navy, the Department of Environmental Quality, NOAA, the Norfolk Wetlands Board, the Willoughby Civic League, and the Cape Henry Audubon Society.

*City of Norfolk*

*Contact: Lee Rosenberg, 804.757.4373*

*November 1993, Dedicated Spring 1994*

*1991 Task 62*



### City of Portsmouth Waterfront Access Study

This study focuses on how to reconnect the people of Portsmouth with the waterfront. The study examined existing and proposed land uses to determine the opportunities and constraints to public access planning. The report concludes with recommendations and strategies to improve shoreline access, and has been adopted by the City Council as a component of the city's comprehensive plan. The plan is also being used by several citizen groups as a guide to develop and improve access to several properties along the waterfront.

*City of Portsmouth*

*Contact: Jocelyn Terry Adunnuab, 757.393.8836*

*November 1995*

*1993 Task 67*

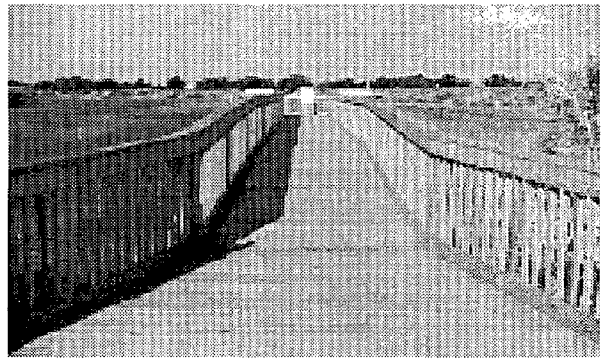


photo courtesy of City of Norfolk

Monkey Bottom Wetland Walkway

### Jones Creek Boat Ramp

The Jones Creek Boat Ramp is a double-wide, handicapped-accessible ramp, located on Jones Creek, a small tributary of the James River, in Carrollton, Isle of Wight County. The Creek provides access to the lower southwestern shore of the River. The lower reaches of Jones Creek are used by watermen of the region as well as area boaters from Isle of Wight County and the surrounding region of Southeastern Virginia. Approximately 43 parking units are available for vehicles and trailers.

*Isle of Wight County*

*Contact: Alan Nogiec, Public Recreational Facilities*

*Authority, 757.357.2217*

*December 1995*

*1992 Task 56*



*See Also: Land Aquisition, page 37:  
Jones Creek: Isle of Wight*

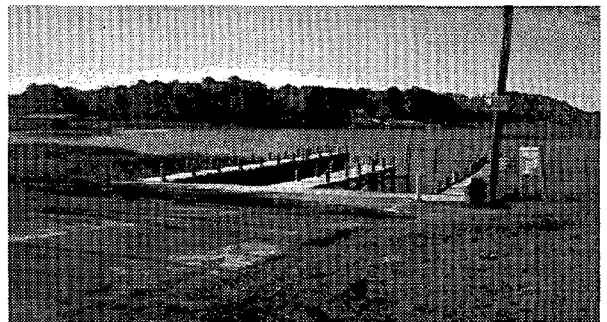


Photo courtesy of Isle of Wight County

Jones Creek Boat Ramp

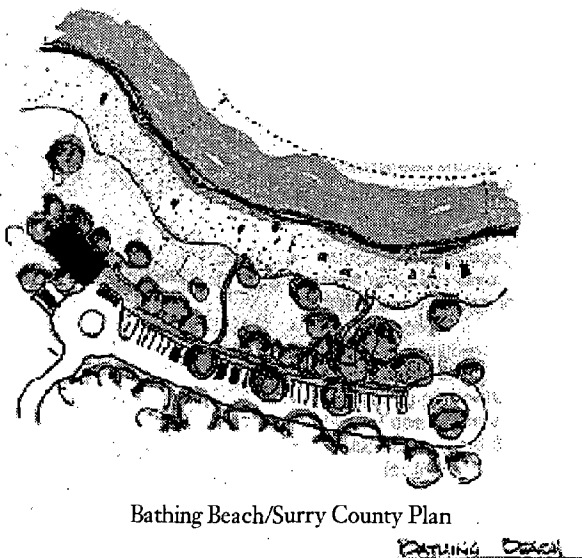
# Public Access: Plans & Construction

## Surry County Watershed Access & Recreation Plan

The purpose of this study was twofold: 1) identify, inventory, and evaluate critical environmental areas, historic and archaeological sites along the James River and its tributaries for public access development, and map these areas, designating potential recreational land uses; and 2) prepare an outdoor recreational access corridor study that can be incorporated into a recreational component of Surry County's Comprehensive Plan.

The **Surry County Waterfront Access and Recreation Plan** contains maps showing a public outdoor recreational access corridor along the James River, and provides a context within which future decisions about waterfront recreational activities and facilities can be made. The Plan serves as a guide to minimize the potential effects of development on these environmentally sensitive areas.

*Surry County*  
*Contact: Angela Hopkins,*  
*Planning Department, 757.294.5210*  
*March 1993*  
*1991 Task 69*



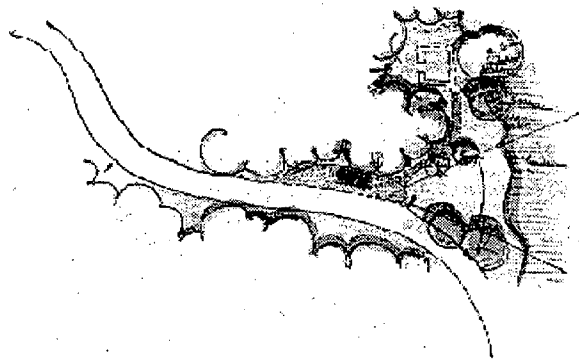
Bathing Beach/Surry County Plan

*Bathing Beach*

## Powhatan Creek Access Area

This project provided an access area for small, nonmotorized boats, including an access beach, launch trail, and parking area planted with native trees. The area is located at the Route 31 bridge crossing the Powhatan Creek. This is the county's only public access to the James River. It was constructed by the city with assistance from several volunteer groups.

*James City County*  
*Contact: Marvin Sowers, 757.253.6685*  
*December 1994*  
*1993 Task 7.2*



Scenic/Interpretive Site/Surry County Plan

## Crabbing Pier Extension

An existing crabbing pier located in Bennetts Creek Park, City of Suffolk, was extended by 120 linear feet. Bennetts Creek is a tributary of the Nansemond River. This pier extension is handicapped-accessible and provides upgraded shoreline access to the citizens of the City of Suffolk.

*City of Suffolk*  
*Contact: 757.925.6485*  
*October 1991*  
*1990 Task 64*



## Public Access: Plans & Construction

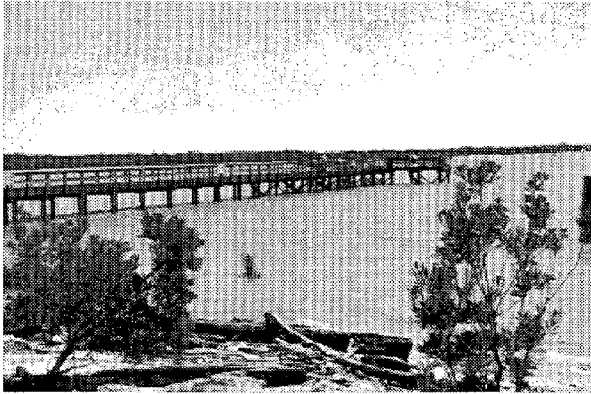


Photo courtesy of Virginia Coastal Program, DEQ

### Wilcox Wharf Public Fishing Pier

Wilcox Wharf, a 285-foot public fishing pier on the James River, is located in the Lawrence E. Lewis, Jr. Park in Charles City County. The pier serves as a wildlife observation point on the river, particularly for the James River Bald Eagle population. Before construction of the pier, public access of this type did not exist along the 33 miles of James River shoreline in Charles City County. Lewis Park also includes woodland habitat, scenic overlooks, a picnic area and restroom facilities.

*Charles City County*

*Contact: John Bragg, Department of Parks  
& Recreation, 804.829.9217*

*May 1992, Lewis Park Dedicated in July 1993  
1991 Task 53*

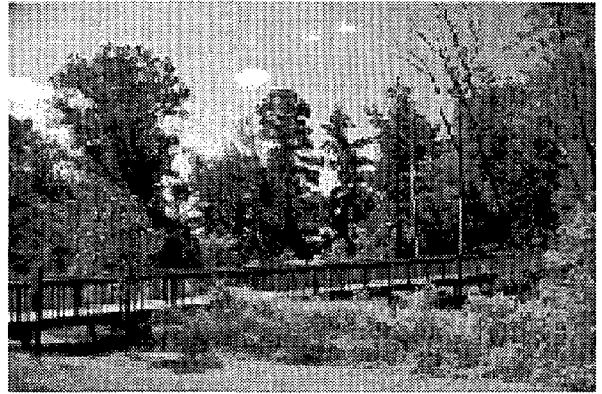


Photo courtesy of Virginia Coastal Program, DEQ

### Lewis Park Walkway and Scenic Overlook

The Lawrence E. Lewis, Jr. Park is Charles City County's newest park. The park is regularly used by the residents of Charles City, Prince George and New Kent counties, as well as the City of Richmond, and other surrounding localities. The park includes a 285-foot fishing pier, two parking lots, restrooms, an access road, a picnic site and a scenic overlook of the James River. Construction of a handicapped-accessible walkway and overlook was completed in 1995. Interpretive signage describing key historical and environmental features was added to the park.

*Charles City County*

*Contact: John Bragg, Department of Parks  
& Recreation, 804.829.9217*

*December 1995  
1994 Task 53*



# Public Access: Plans & Construction

## Mayo's Island Public Access Plan

This project evaluated the potential for providing public access to Mayo's Island for open space and recreation use. Mayo's Island has the potential to become a hub and focal point for Richmond's downtown riverfront. It also has the potential to become a more desirable habitat for wildlife. Its size, location, and access offers opportunities for both active and passive uses, combined with modest economic development. The island is currently under private ownership. Options for direct acquisition of the island by purchase or donation, land exchange, lease or joint development are discussed.

*City of Richmond*  
*Contact: Ray Sutton, 804.780.5695*  
*July 1996*  
*1994 Task 64*



## Shoreline Public Access Study

During this pilot study, DCR identified three model passive access sites, unused publicly-owned parcels of waterfront property, and explored the opportunities and required procedures for converting these sites into small recreational access areas. These sites, Hallieford Public Landing and Peary Public Landing in Mathews County and Bray's Point Landing in Gloucester County, include beach and swimming access, pier and bank fishing, and natural areas.

The study also includes an initial inventory and screening of small publicly-owned parcels of land in the Middle Peninsula which have little or no site improvements, and show potential for providing beach and swimming access, pier or bank fishing, or natural area access. This study serves as a planning model for localities considering public access improvements to small publicly-owned parcels.

*Virginia Department of Conservation and Recreation*  
*Contact: John Davy, 804.786.1119*  
*March 1992*  
*1990 Task 22*

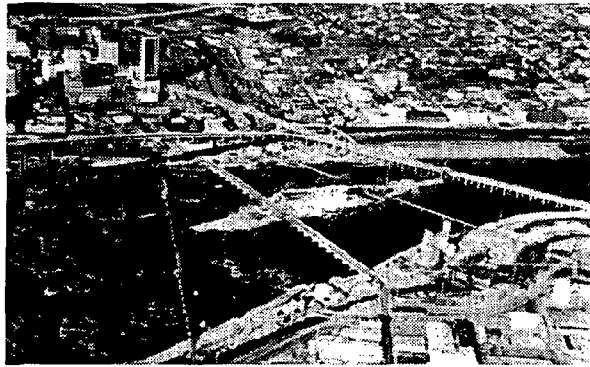


Photo courtesy of JHR Associates

Aerial view of Mayo's Island

## Dragon Run Public Access Plan

This plan includes maps of potential public access sites, a description of these sites, an estimated cost of acquisition of each site, and potential funding options for local government purchase. Management strategies are also proposed. This plan is part of a larger management plan for the Dragon Run watershed.

*Middle Peninsula Planning District Commission*  
*Contact: Jim Uzel, 804.758.2311*  
*October 1993*  
*1992 Task 58*



## Occoquan Riverfront Boardwalk

The Town of Ocoquan, founded in 1734, is located along the southern bank of the Ocoquan River near the Potomac River in Prince William County. The town undertook a study to improve pedestrian access to the town's historic waterfront through construction of an Ocoquan Riverfront Boardwalk. The boardwalk would enhance the historic ambiance of the town and allow residents and tourists alike to stroll along the shore for approximately 1500 feet past small shops and historic buildings on their way to the Ocoquan Museum. The study included preliminary engineering with analysis of existing bulkheads, materials to be used and cost estimates.

*Town of Ocoquan*  
*Contact: James Barnes, 703.491.1918*  
*August 1995*  
*1993 Task 68*





# Public Access: Plans & Construction

## Upper Reaches Canoe Access Guide of Middlesex, King and Queen, Gloucester, and Mathews Counties

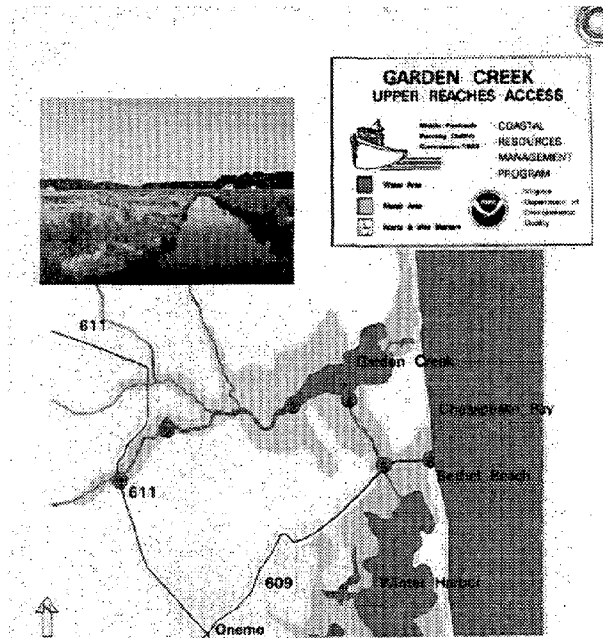
The tidal rivers, bays and streams of the Middle Peninsula have been more heavily utilized for recreational and educational activities than the numerous upper reaches of creeks and streams. This laminated canoe access guide can be clipped to the side of a canoe. It not only provides maps detailing access points for canoes, but also interpretive information about the upper reaches of rivers and creeks in the Middle Peninsula. Each of the 12 laminated sheets contains interpretive highlights of a single stream segment, including: Beaverdam Reservoir, Burnt Mill Creek, Hoskins Creek, Garden Creek, Pamunkey River, Rigby Island, West Island, Wilton Creek, Parrotts Creek, Poropotenk River, Occupacia Creek, and Mattaponi River. Additional sheets may be added in the future.

*Middle Peninsula Planning District Commission*

Contact: Jim Uzel, 804.758.2311

December 1992

1991 Task 59, 1992 Task 58 (updated)



Page from the Upper Reaches Canoe Access Guide: The areas numbered on the map indicate points of interest along the waterway. Each point of interest is described in greater detail on the back of the map.

## Potomac River Public Access Plan

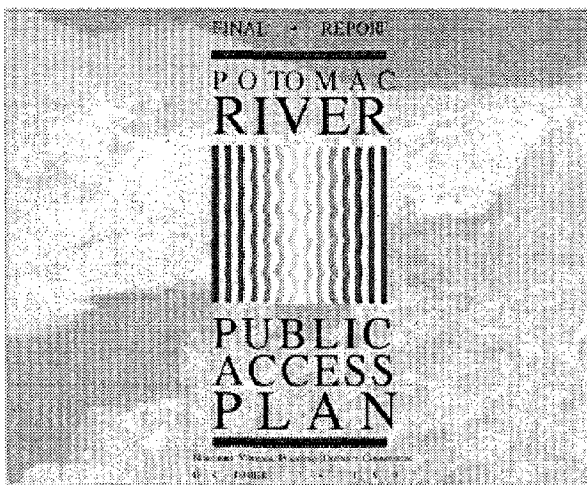
This plan provides information on more than 150 existing, planned, and potential public access sites along 140 miles of Northern Virginia's Potomac River shoreline. The corridor is analyzed in 18 segments and includes detailed maps and summaries of the shoreline. The plan also analyzes the potential alignment of the Potomac Heritage National Scenic Trail, one of only 19 designations in the United States. Detailed maps and summaries also exist for the proposed trail alignment.

*Northern Virginia Planning District Commission*

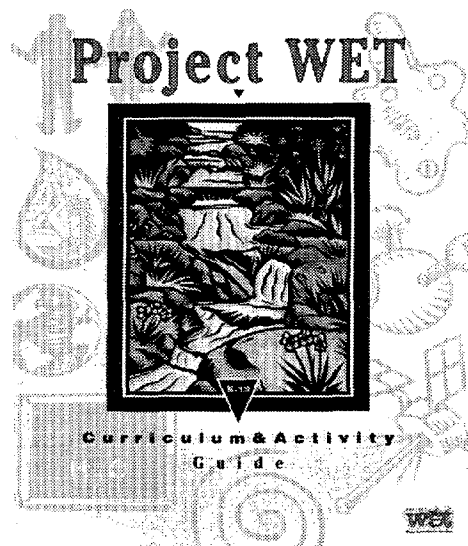
Contact: Doug Pickford, 703.642.0700

October 1995

1994 Task 63



# Public Education



# Public Education

## Project WET



### Curriculum & Activity Guide

WET

## Environmental Education/Project WET

Project WET, Water Education for Teachers, is a K-12 supplementary curriculum that addresses a number of coastal zone management priorities. Approximately 500 educators are trained annually by Project WET volunteer instructors. During the 6-hour workshops, teachers are introduced to Project WET's age-appropriate, science-based lessons about surface- and ground-water quality, cultural and historical water uses, nutrients, as well as freshwater, riparian, wetland and estuarine habitats. Lessons also guide students and teachers in activities for meaningful public participation. Other projects supported by the grant include: the annual Conference for Environmental Education, the Directory of Environmental Education Resources, and the Department of Education's Standards of Learning Education Project.

Virginia Department of Environmental Quality  
Contact: Ann Regn, 804.698.4442  
Current Ongoing Activity  
1993 - 1996 Task 2.1

## Virginia Coastal Program Newsletter

The Virginia Coastal Program News provides an important forum to Virginia's partners in coastal zone management, including the state agencies which administer the program's eight core programs, the local officials and governments who address coastal resource management issues on the local and regional level, environmental and conservation groups who play a key role in helping to implement measures to protect and preserve coastal resources, and Virginia's citizens who are at the core of effective and successful coastal resource management.

The newsletter is published three times a year (Winter, Spring/Summer, Fall). The program currently distributes 1500 copies of the newsletter.

Virginia Department of Environmental Quality  
Contact: Virginia Witmer, Virginia Coastal Program,  
804.698.4320

Ongoing Outreach Activity  
1996 Task 1, 1997 Task 2



**VIRGINIA COASTAL PROGRAM NEWS**

Fall/Winter 1997  
Volume 7  
Number 5

### Charting the Future of the Virginia Coastal Program

The 25th Virginia Coastal Resource Management Program Council on their first session in Virginia's coastal zone, discussed the future of the program and the importance of the state's 300 miles of federal GOMR lands, more than 400 miles of state and local coastal lands. A wide range of issues were discussed, including the state's coastal zone management issues on the local and regional level, environmental and conservation groups who play a key role in helping to implement measures to protect and preserve coastal resources, and Virginia's citizens who are at the core of effective and successful coastal resource management.

### Restoring Life in Magothy Bay

The Magothy River, one of the largest rivers in the state, flows into the Chesapeake Bay. The river's health is critical to the health of the bay and the state's coastal resources. The Virginia Department of Environmental Quality is working with local officials and citizens to restore the river and the bay. The project includes the construction of a new dam, the installation of a new water treatment plant, and the restoration of the river's natural habitat.

### In this Issue...

- Restoration in Virginia...
- State of the Bay...
- Coastal Zone Management...
- Environmental Quality...
- Public Participation...

# Public Education



## Chesapeake Youth Conservation Corps

The Chesapeake Youth Conservation Corps is a program designed to educate and involve at-risk youth (first-time offenders) in environmental activities benefitting the Chesapeake Bay and its watershed, and surrounding communities. The Coastal Program has provided support to the Corps since 1993. During this period the Corps has provided valuable educational and work experience through activities such as: building a wildlife refuge, cleaning up shorelines, weekly water testing, stenciling storm drains with "Don't Dump", planting trees and beach grass, building osprey nesting platforms and Wood Duck boxes, participating in erosion control projects, and adopting beaches. The Corps has received numerous rewards for their efforts.

City of Chesapeake

Contact: William Cutbriell 757.382.8184, Dourina

McCullen, 757.382.8196

Ongoing Activity

1993 Task 2.3, 1994 Task 2.8, 1995 Task 2.8, 1996 Task 52



## Natural Heritage Resources Fact Sheets

A series of educational fact sheets, written and distributed by the Natural Heritage Program at the Department of Conservation and Recreation, which describe not only the rarest species, natural communities, and invasive species in the Coastal Zone, but also natural area protection and management tools. These facts sheets are used to promote the conservation of the biological diversity in Virginia's coastal zone, and have been distributed to public and private natural area owners, citizens, localities, natural resource agencies, and conservation organizations. They are also available on the DCR, Natural Heritage web site at <http://www.state.va.us/~dcr/vaher.html>.

The topics of the fact sheets include: **Rare Natural Environments:** Sea-level Fens, seasonal ponds, Turkey Oak Sandhills, Bald Cypress-Water Tupelo Swamp, Pocosins; **Natural Area Protection:** What is Natural Area Dedication?, What is a Natural Area Management Agreement?, Fire and Natural Areas: An Overview, Natural Area Stewardship; **Invasive Alien Plant Species of Virginia:** Mile-a-minute, Porcelain-berry, Kudzu, Asiatic Sand Sedge, Tree-of-Heaven.

Virginia Department of Conservation and Recreation

Contact: Kevin Heffernan, 804.786.7951

June 1994

1992 Task 2.5



## Invasive Alien Plant Species of Virginia

### Japanese Honeysuckle (*Lonicera japonica* Thunberg)

#### Description

Japanese Honeysuckle is a trailing or twining woody vine that can grow to more than 80 feet in length. Young stems are often hairy; older stems are hollow with brownish bark that may peel off in sheets. The simple, opposite leaves are oval to elliptical in shape and range from 1.5 to 3 inches in length. In much of Virginia, leaves of Japanese honeysuckle are semi-evergreen and may persist on vines year-round. The extremely fragrant, two-lipped flowers are borne in pairs in the axils of young branches and are produced throughout the summer. Flowers range from 1 to 2 inches in length and are white with a slight purplish pink tinge when young, changing to white or yellow with age. The fruit is a many-seeded, black, jelly berry that matures in early autumn. Japanese honeysuckle is distinct from our two native honeysuckles, the trumpet honeysuckle (*Lonicera sempervirens*) and the white honeysuckle (*Lonicera dioica*). These natives both bear red or orange-red berries, and their opposite pair of leaves is joined together.

#### Habitat

Japanese honeysuckle occurs primarily in disturbed habitats such as roadsides, trails, fence rows, abandoned fields and forest edges. It often invades native plant communities after natural or human-induced disturbance, such as logging, roadbuilding, clearing, grazing and mowing, or fire and disease outbreaks.

#### Distribution

Japanese Honeysuckle is native to eastern Asia. Introduced to cultivation in 1867 as a large-leaved Japanese honeysuckle, it now widely naturalized in the eastern and central United States. Japanese honeysuckle was used in some areas still is planted as an ornamental ground

cover, for erosion control, and for wildlife food and habitat in Virginia. Japanese honeysuckle is naturalized statewide, being most abundant in piedmont and coastal plain forests.

#### Threats

Where light levels are reduced, such as in forest edges, canopy gaps or under sparse open forest, newly established Japanese honeysuckle vines grow and spread rapidly. Suppressed vines growing in dense shade, however, are capable of rapid growth and spread with light levels in a habitat are increased by disturbance. In forests, Japanese honeysuckle vines spread both vertically and horizontally by climbing up tree trunks and by trailing or scrambling over the forest floor and associ-



Japanese Honeysuckle (*Lonicera japonica*)

For more information, contact the Department of Conservation and Recreation or the Virginia Native Plant Society.

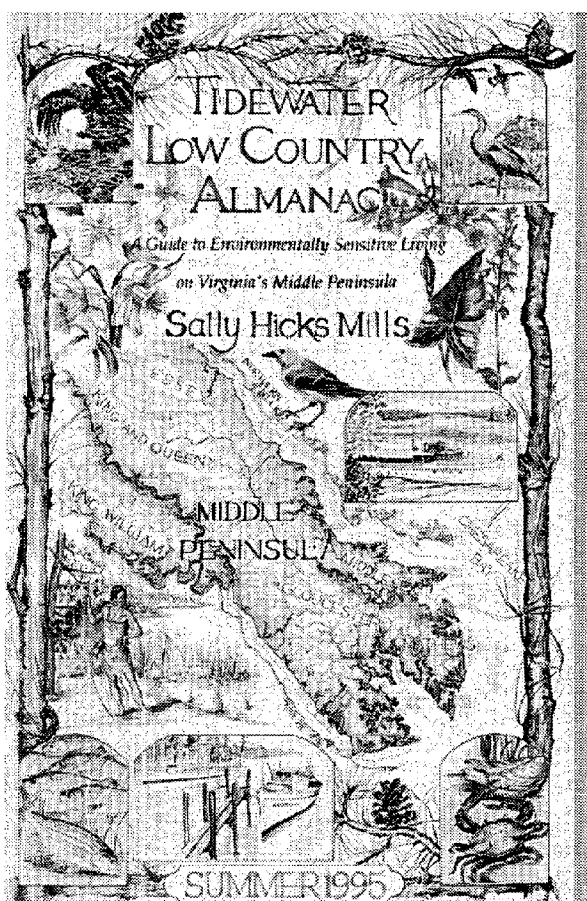


Department of Conservation and Recreation  
1500 E. Main Street, Suite 212, Richmond, VA 23219  
(800) 794-7991

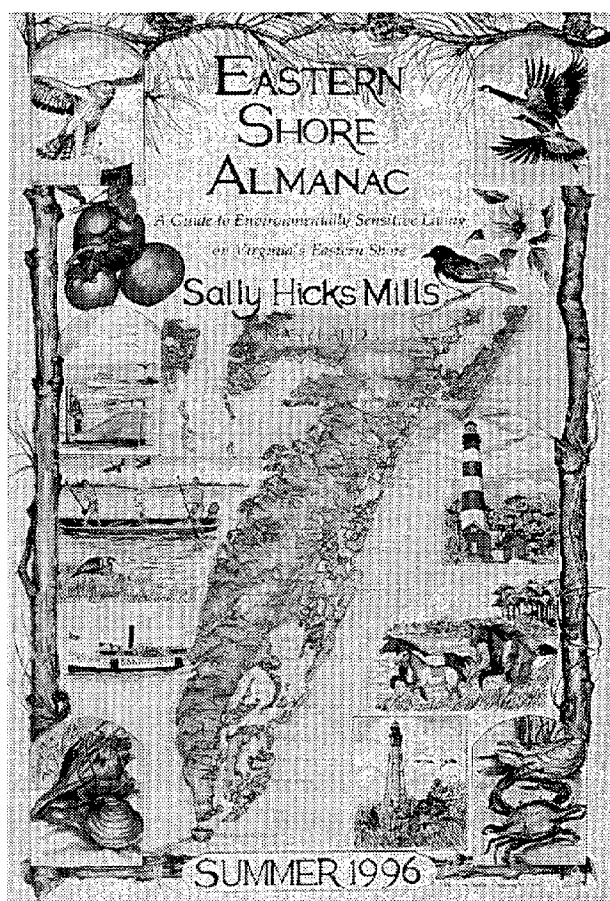


Virginia Native Plant Society  
P.O. Box 100, Annandale, VA 22009

## Public Education



Cover art by Ann Sader



Cover art by Ann Sader

### Tidewater Low Country Almanacs

The Tidewater Low Country Almanacs are regional guides intended to promote environmentally-friendly living in the home landscape of Virginia's coastal watersheds. The almanacs specifically target rural regions, which are often environmentally-sensitive, and are grappling with development pressures. The almanacs carry a message of stewardship.

Each approximately 80-page guide includes a brief regional history overview, a natural resource primer, and a review of the Chesapeake Bay Preservation Act and other conservation initiatives in the Commonwealth. Several chapters are devoted to the principles of conservation landscaping and followed by a regional native plants list for home planting. Also included is a telephone directory to help citizens find the appropriate local, state, or federal agency contacts for assistance on specific questions. The almanacs are popular for their "user-friendly" information and beautiful cover maps and illustrations. To date, almanacs have been produced for Virginia's Middle Peninsula, Eastern Shore and Northern Neck.

*Tidewater Low Country Almanac  
for the Middle Peninsula*  
Tidewater Soil and Water Conservation District  
Contact: Burton Bland, 804.693.3562

Summer 1995  
1993 Task 2.7



*Tidewater Low Country Almanac  
for the Eastern Shore*  
Accomack-Norhampton Planning District Commission  
Contact: Jim McGowan, 757.787.2936

Summer 1996  
1995 Task 53



*Tidewater Low Country Almanac  
for the Northern Neck*  
Northern Neck Planning District Commission  
Contact: Vonnie Reynolds, 804.529.7400

Winter 1997  
1994 Task 2.13





## Public Education



Portion of the Common Saltwater Sportsfish Species of Virginia poster.

### Aquatic Resource and Agricultural Land Use Conference Materials

This conference was held to educate soil and water conservation district employees, who in turn, heighten landowner understanding of aquatic systems and the impacts of nonpoint source pollution. Sessions included an introduction to the Chesapeake Bay and coastal watersheds; a discussion of man's influence on surface and ground water, nutrients, pesticides, and the role of wetlands; the effects of nonpoint source pollution on waterfowl, submerged vegetation, finfish, mollusks, and shellfish; and a waterman's perspective of how pollution impacts the seafood industry.

*Virginia Department of Conservation and Recreation*

*Contact: Moira Croghan, 804.786.3958*

*March 1994*

*1992 Task 2.1*



### Common Saltwater Sportsfish of Virginia

Colored poster depicting twenty-four species of fish common to Virginia's tidal waters.

*Virginia Department of Game and Inland Fisheries*

*Contact: Anne Skalski, 804.367.1000*

*March 1993*

*1991 Task 2*



### Fish Passage Display on the James River

Portable display unit that provides information concerning the striped bass population, including fish passage and blockage, on the James River Landings for the past 65 years.

*Virginia Department of Game and Inland Fisheries*

*Contact: Anne Skalski, 804.367.1000*

*March 1993*

*1991 Task 2*



## Public Education

### **Fiddling Around with Fiddlers & Oysters and Oyster Reefs: A Winning Combination for the Future of the Chesapeake Bay**

This project developed two educational brochures about the ecology, behavior and habitat requirements of two important species found along the York River and in the Chesapeake Bay National Estuarine Research Reserve in Virginia. *Fiddling around with Fiddlers* and *Oysters and Oyster Reefs: A winning combination for the Chesapeake Bay* describe the life cycles and ecological importance of these Chesapeake Bay residents.

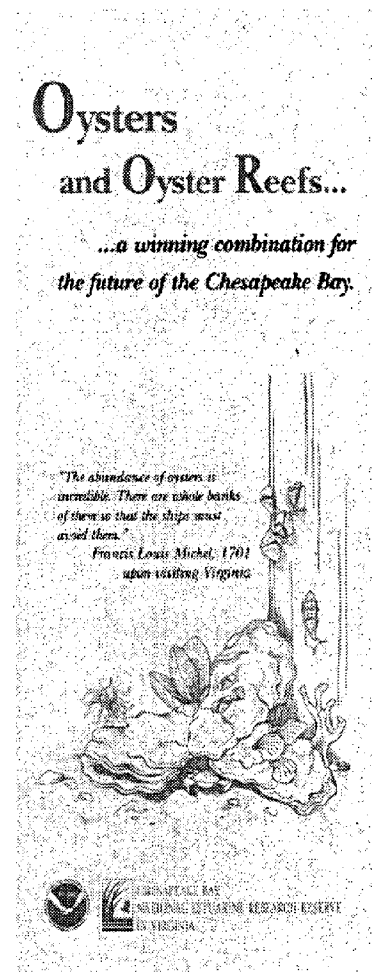
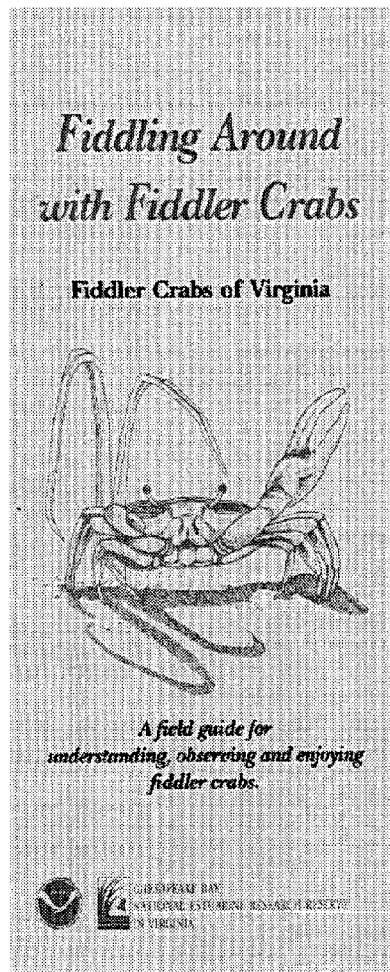
These brochures have been very successful, and requests for copies from around the country continue. They are also popular among reserve visitors and are used as educational tools in Reserve education programs, as well as in educational efforts by other coastal agencies throughout the Commonwealth.

*Virginia Chesapeake Bay National Estuarine Research Reserve System (CBNERRS)*

*Contact: Maurice "Mo" Lynch, 804.642.7135*

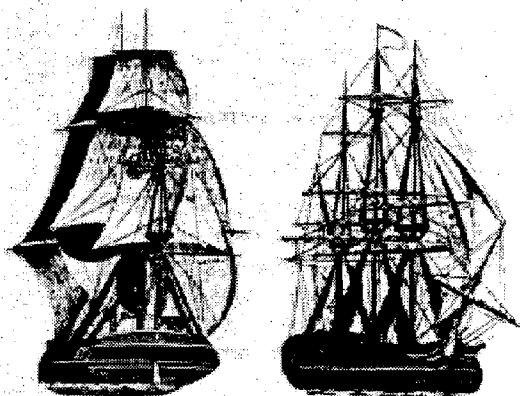
*Fall 1994*

*1993 Task 2.6*



## Public Education

# HISTORY UNDER WATER



### Exploring Virginia's Underwater Historic Resources

### A Guide to the Bay Act

The Chesapeake Bay Preservation Act was passed by the Virginia General Assembly in 1988. The purpose of the Bay Act is to protect the water quality of the Chesapeake Bay and its tributaries through measures to reduce adverse impacts of land use and development. The program is implemented through an active partnership between the Commonwealth and Virginia's Tidewater local governments.

This guide to the Bay Act was prepared by the Chesapeake Bay Local Assistance Department as a general reference for Virginia's citizens. Given the uniqueness of local Bay Act programs, the guide does not attempt to guide property owners on site-specific requirements, but to provide an overview of the purpose and intent of the Bay Act and the components of a local Bay Act program.

*Chesapeake Bay Local Assistance Department*  
Contact: Scott Kudlas, 804.225.3441  
Fall 1995  
1994 Task 9



### History Under Water: Exploring Virginia's Underwater Historic Resources

The goal of this project was to increase public awareness of submerged historic resources, to present the results of **An Assessment of Virginia's Underwater Cultural Resources** (funded through an earlier NOAA grant - 1993 Task 11) to the dive community, and other interested individuals and groups, and to foster cooperation between the Department of Historic Resources and members of the public interested in submerged historic sites and objects. The Department worked with the Maritime Archaeological and Historical Society to host public workshops in Alexandria and Norfolk. The Society is a private, non-profit educational organization supporting responsible documentation of submerged historic sites.

A brochure was produced, **History Under Water: Exploring Virginia's Underwater Historic Resources**. This brochure briefly outlines some of the types of historic (and prehistoric) sites that can be found in Virginia's waters and the importance of reporting these sites and keeping them intact for future study, education and recreation. It also summarizes the situations in which various permits are required from the Navy, the U.S. Army Corps of Engineers and the Virginia Marine Resources Commission, and gives contacts for more information on submerged resources, permitting, training, and volunteer opportunities.

*Virginia Department of Historic Resources*  
Contact: Catherine Slusser, 804.225.3556  
November 1996  
1994 Task 14



*See Also:*  
Environmental Management, page 15 -  
*An Assessment of Virginia's Underwater Cultural Resources*



## Public Education

### Nonstructural Alternatives for Shoreline Stabilization

Local wetlands boards and the Virginia Marine Resources Commission receive up to 600 applications for shoreline stabilization projects annually. Most are proposals to build bulkheads and stone revetments to control eroding shorelines. In some cases, VMRC staff have found wave energies do not justify construction of such structures. The brochure, *Shoreline Erosion Problems? Think Green*, will help ensure that nonstructural alternatives to shoreline stabilization are included among the options known to property owners. The brochure discusses two types of marsh grass species, how and where to plant them, and illustrates the benefits to water quality and wildlife of using these grasses.

*Virginia Marine Resources Commission/Virginia Institute  
of Marine Science*

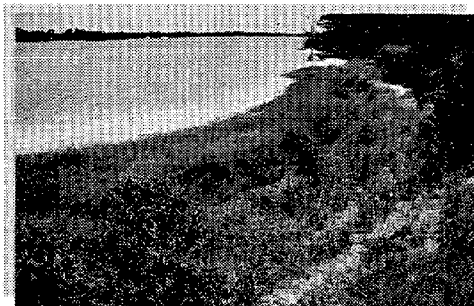
Contact: Scott Hardaway, 804.642.7177

May 1994  
1992 Task 27



### SHORELINE EROSION PROBLEMS? Think Green . . .

Control shoreline erosion, help restore the  
Chesapeake Bay and save money all at the same time.



If you have low to moderate shoreline recession problems, establishing marsh vegetation can provide long term shoreline stabilization at a fraction of the cost of conventional structures such as bulkheads and rock revetments. Additionally, no permits are required in many cases. A significant benefit to this "green" approach is the enhancement of Chesapeake Bay water quality and habitat availability.

### Virginia Erosion and Sediment Control Field Manual

Many individuals, businesses and government agencies expressed an interest in a pocket-sized version of the 1992 *Virginia Erosion and Sediment Control Handbook* for field use. The field manual was created and contains technical drawings and specifications to assist users in the implementation of proper erosion and sediment control measures. This "field manual" is a supplement to the Handbook. It was developed especially for people who must implement the State Erosion and Sediment Control Program in the field, such as local inspectors and job superintendents or foremen of construction projects. This pocket size field manual is available for order. It is also available in a universally accepted AutoCAD format.

Design criteria and design considerations can be found in the Handbook. The Handbook is a technical guide for complying with the requirements of the Virginia Erosion and Sediment Control Law and regulations. The Erosion and Sediment Control Program is an enforceable, mandatory program in Virginia's Coastal Zone, and throughout the state. The Handbook details numerous guidelines, technical standards, specifications and support materials to assist individuals responsible for regulating, permitting, enforcing and complying with erosion and sediment control requirements in coastal areas of Virginia and other states. Over 4,000 copies of the handbook have been distributed in Virginia.

*Virginia Department of Conservation and Recreation*  
Contact: Jimmy Edmonds, 804.786.3997

June 1995  
1993 Task 22, 1994 Task 2.14



### 1991 Nor'easter on Cedar Island

A 20-minute video which documents the progress of beach erosion and the devastating results of the 1991 nor'easter on Cedar Island, in Accomack County, off the Atlantic coast of Virginia's Eastern Shore.

*Virginia Marine Resources Commission*  
Contact: Chris Frye, 757.247.2200

March 1993  
1991 Task 2



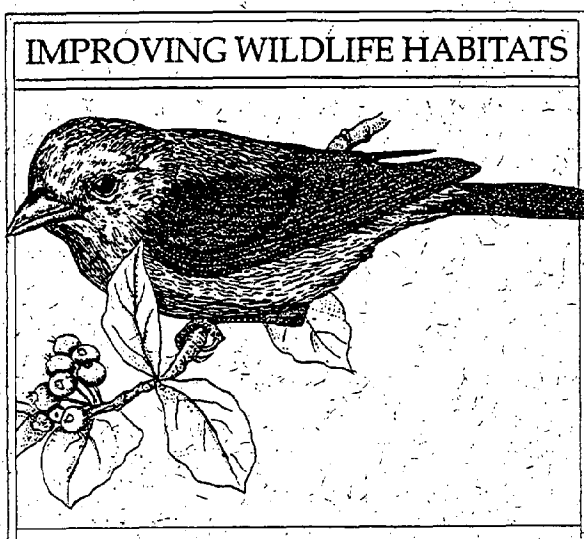
## Public Education

### Environmentally-Sound Landscape Management - Bayscapes

Bayscaping is an environmental education initiative developed by the Alliance for the Chesapeake Bay which teaches, through a series of workshops and publications, how to save time, energy, and money by using low-input landscape management to protect the streams, rivers, and waters of the Chesapeake Bay. The five principles of Bayscaping are: practice conservation landscaping, conserve water, create diversity, use beneficial plants, and plan for the long-term.

An extremely popular **Bayscapes** brochure was developed, which introduces the broad concepts of **Bayscaping** in a general manner. Pull-out fact sheets discuss the following topics: integrated pest management, long-term planning when planting, improving wildlife habitats, creating diversity, using beneficial plants, conservation landscaping, and conserving water. The brochure also includes a listing of plants beneficial to the Bay and our coastal waters, and guides the reader to other sources for more specific information. Reprintings funded by the Coastal Program and additional grants from a variety of sources has resulted in the distribution of more than 40,000 copies of the Bayscapes brochure.

*Alliance for the Chesapeake Bay*  
Contact: Sarah Richardson, 804.775.0951  
March 1993, Second Reprinting July 1995  
1991 Task 2, 1995 Task 2.10



### NVironment Newsletter

The Northern Virginia Planning District Commission's newsletter, the **NVironment** has the following goals: to increase awareness of regional environmental problems requiring local attention; to increase awareness of State, regional, and local coastal resources management initiatives; to disseminate information on various local solutions to environmental problems; and to provide information on new environmental legislation and regional environmental cooperative efforts. The **NVironment** currently has an audience of over 1,300 individuals and agencies and is published at least twice a year (Winter/Spring and Summer/Fall).

*Northern Virginia Planning District Commission*  
Contact: David Bulova, 703.642.0700  
1986-96 Task 31  
(Ongoing Coastal Technical Assistance Activity)



## Public Education

### Birds of the York River

This project developed a series of brochures about the ecology, behavior, habitat requirements and migration patterns of the bird species found along the York River and in the Chesapeake Bay National Estuarine Research Reserve in Virginia. Each brochure in the Birds of the York River series, **Taskinas Creek**, **Sweet Hall Marsh**, **Catlett Islands**, and **Goodwin Islands**, describes the key species and habitats found along the York River and includes a species check-list to help birdwatchers with locating and documenting sightings.

These brochures have been well received by Reserve visitors. They have been used by "non-birders" as an introduction to birds, and also by avid birders as a field guide supplement.

*Virginia Chesapeake Bay National Estuarine Research Reserve (CBNERRS)*

Contact: Maurice "Mo" Lynch, 804.642.7135

August 1994

1992 Task 2.3



### The Bald Eagle of Virginia: A Management Guide for Landowners

A full-color management guide for landowners who currently have Bald Eagles on their property or may have them in the future. This guide provides basic background information on the natural history of eagles and some information on management guidelines. It's goal is to increase the general public's awareness of the conservation efforts involving the Bald Eagles of the lower Chesapeake Bay.

*College of William & Mary, Center for Conservation Biology*

Contact: Bryan Watts, 804.221.2247

June 1995

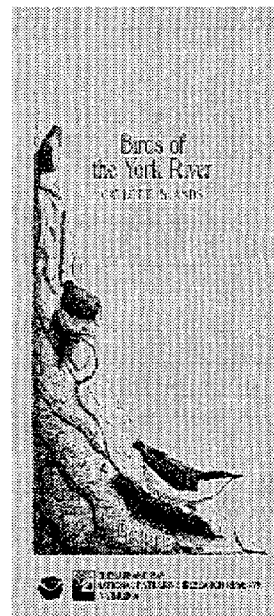
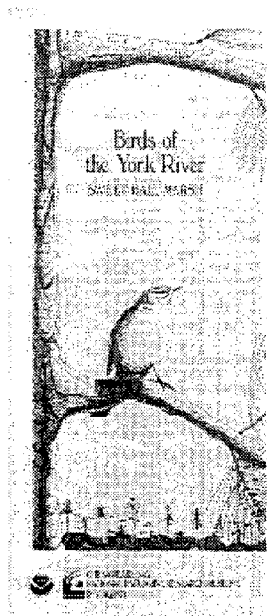
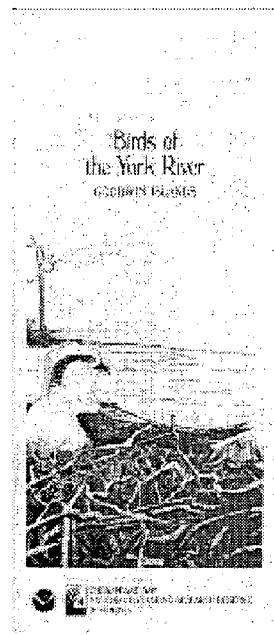
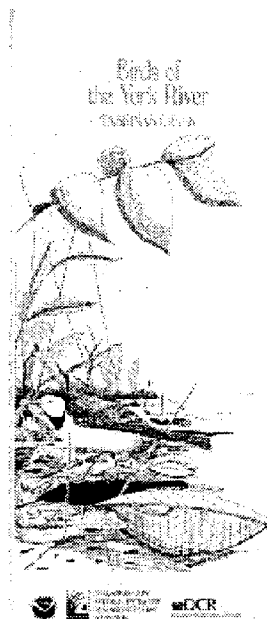
1992 Task 2.4



See Also:

Habitat & Wildlife Management, page 28:

*The Bald Eagle in Virginia: An Information Booklet for Land Planners*



## Public Education

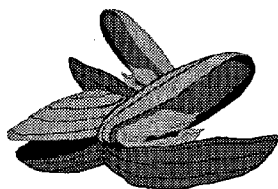
### Oyster Reef Symposium

The decline of oyster resources along most of the U.S. Atlantic and Gulf coasts has resulted in declines in the oyster fishery, and loss of critical reef habitat and ecosystem functions. A symposium entitled, **Oyster Reef Habitat Restoration, A Synopsis and Synthesis of Approaches**, was organized for resource management planners, industry representatives, and others in an effort to summarize and synthesize available information related to oyster reef habitat management practices and the ecological characteristics of the oyster reef habitat.

The Symposium was sponsored by state agencies from Virginia, Maryland, and South Carolina, the EPA, NOAA's Chesapeake Bay Program, the Chesapeake Bay Foundation, Atlantic Estuarine Research Society, Virginia Power and the Virginia Coastal Program.

Symposium topics included historical distributions of oyster reefs; overviews of ongoing restoration activities; ecological perspectives on reef development and utilization; disease management issues; the efficacy of using alternative substrates and the economic costs and benefits associated with restoration efforts. A 29-page program containing schedules and abstracts from all 40 scientific presentations is available. Two thousand copies of the symposium announcement and 800 copies of the program booklet were distributed. The symposium, which was attended by over 150 people, helped to focus attention on the ecological importance of oyster reef habitat.

*Virginia Institute of Marine Science  
Contact: Mark Luckenbach, 804.787.5816  
April 1995  
1993 Task 2.5*



### Constructed Wetlands for Wastewater Treatment - A Seminar

This project was developed and implemented by a planning committee from five partnering agencies: Henricopolis Soil and Water Conservation District, Virginia Department of Health, Virginia's Secretary of Natural Resources and Department of Environmental Quality, CH2MHill, and Resource International, Ltd.

The seminar was led by several of the foremost technological experts in the field of constructed wetland systems. The targeted audience was professional civil and environmental engineers, sanitarians, and government regulators. The seminar's goal was to provide information about current, proven technology on constructed wetland treatment systems, including treatment wetlands, hydrological and chemical tools, pollution reduction, nutrient reduction, design, costing and operation and maintenance.

The seminar was attended by 170 people. Interest has been shown in holding related conferences.

*Henricopolis Soil and Water Conservation District  
Contact: Terry Rublen, 804.672.5176  
October 1996  
1995 Task 2.7*



### Wetlands Newsletter & Technical Reports

The Virginia Institute of Marine Science's Wetlands Program produces the **Technical Report**, a monthly newsletter, and a series of wetlands technical fact sheets. Both of these publications are committed to furthering the preservation of wetlands and the prevention of wetland despoliation and destruction. Topics of interest include: tidal wetland values, wetland species descriptions, nontidal wetland policy, cumulative impacts of shoreline construction, wetlands and watershed management, and wetland mitigation banks.

*Virginia Institute of Marine Science  
Contact: Carl Herslmer, 804.642.7000  
1989 Task 8, 1990 Task 8, 1992 Task 13, 1993 Task 24,  
1995 Task 12, 1996 Task 16*



## Public Education

### Wetlands Education Curriculum

The **Wetlands Education Curriculum** consists of a lecture series addressing the tidal wetland management program in Virginia. The lectures are designed for presentation by the Wetland Program staff of the Virginia Institute of Marine Science. The lecture series provides a consistent and comprehensive curriculum for wetland board members, planning staff, coastal resource managers, applicants, agents, contractors, and interested citizen groups.

The curriculum provides technical information on basic ecological, management and procedural issues central to appropriate management of the Commonwealth's tidal wetland resources. Each unit provides a standardized set of technical information in a consistent format.

The curriculum includes 19 education units, or sections, which address the basic needs and concerns of tidal wetland managers. These include values and functions of tidal wetlands, critical examination of coastal structures and their impacts to the marine environment, and the role of the local wetlands boards. The manual also includes more advanced lectures such as marine development, wetland mitigation and compensation, and plant and animal adaptations to the marine environment. Field trips are offered to reinforce lecture material. Field work will generally be held in conjunction with classroom training. An Instructor's Manual has also been produced.

Four of the Tidal Wetland Education units are available in a self-taught format. Each unit comes with a video-tape, reference materials, and a final self-exam. These units focus on Wetlands Ecology, Wetlands Values, Coastal Structures, and Human Activities: Impacts and Alternatives.

*Virginia Institute of Marine Science  
Contact: Bill Roberts, 804.642.7380  
January 1994, April 1996  
1990 Task 15, 1992 Task 12, 1994 Task 17*

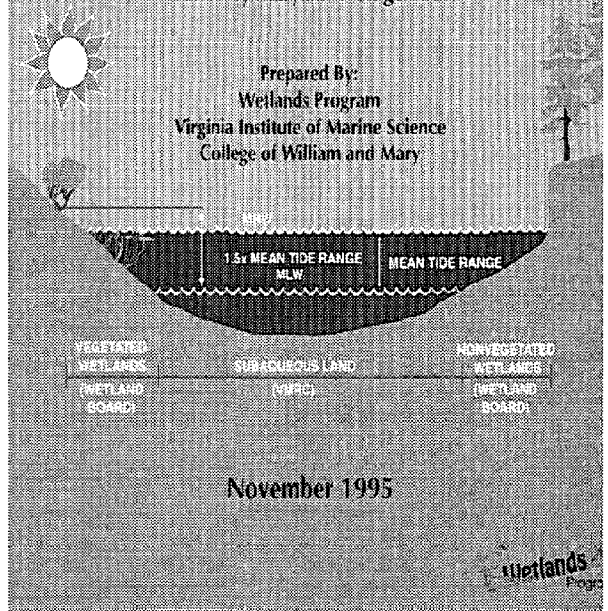


### SELF-TAUGHT EDUCATION UNIT

#### Coastal Resources: Definitions and Jurisdictions

By Julie G. Bradshaw  
Edited by Maryann Wohlgemuth

Prepared By:  
Wetlands Program  
Virginia Institute of Marine Science  
College of William and Mary



### Coping with Wetlands Workshop Series

This technically-oriented series of workshops, designed for developers and consultants, government officials, and the general community, including citizens and teachers, offered strategies for confronting the complex issues of advance planning for wetlands identification, mitigation, and permitting.

*Northern Virginia Planning District Commission  
Contact: David Bulova, 703.642.0700  
July 1991  
1990 Task 31*



# Public Education

## Coastal Virginia Ecotour Guide Certification Training Program

Local ecotour businesses introduce the commonwealth's natural resources to thousands of visitors each year. Ecotourism makes sense for coastal Virginia, and responsible, educated ecotour guides and ecotourists, and an "ecotourism code of ethics," could play a vital role in the future protection and health of our unique coastal ecosystems and cultural resources as well as in promoting sustainable development of a successful ecotourism industry. Ecotourism can help strengthen faltering local economies through diversification and innovation. The keys to attaining this dual goal are communication, planning, and education.

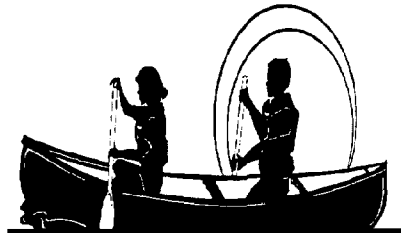
As currently conceptualized, a voluntary ecotour guide certification program would serve three fundamental purposes: 1) protect shared natural resource capital from misuse caused by a simple lack of knowledge; 2) provide a valuable marketing edge to guides who earn an official "seal of approval" or certification logo; and 3) foster sustainable growth of Virginia's ecotourism industry by offering ecotourists high quality, educational experiences.

A draft Ecotour Guide Certification Training Curriculum for Coastal Virginia was developed that includes three basic elements: 1) the role of ecotourism in coastal resource conservation and local economic development; 2) the natural limits of sensitive resources and the need for a cooperative approach to protecting ecotourism's assets; and 3) a basic understanding of the natural history of coastal Virginia. The curriculum is divided into two parts. The first part details a three-day regional workshop which would focus primarily on the above elements (1) and (2) and secondarily on element (3). The second part consists of a series of locally-oriented field trips that highlight natural history (element). Included in this are outlines for three local field training excursions designed for the Eastern Shore.

This draft curriculum also proposes the creation of an advocacy organization or association (it may be a private cooperative, independent non-profit, or public-private partnership). This ecotourism association would provide new information to members, insuring quality among certified ecotour businesses, promoting certified operators, and protecting shared natural assets. To earn certification, ecotour businesses would be required to participate in a training workshop and a number of local field-based training excursions tailored to their bioregion. Minimum standards of operation would be required to maintain certification, as would participation in a continuing-education program.

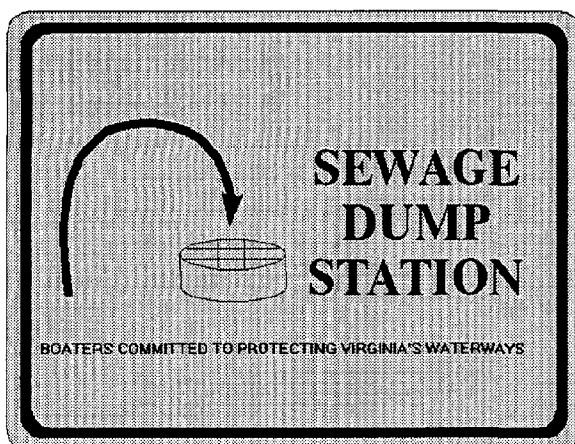
The Coastal Program has presented this curriculum and the voluntary ecotour guide certification program concept to ecotour guides and businesses, local governments and other state agencies in a series of meetings in the summer and fall of 1997. Discussions will continue into 1998.

*Virginia Department of Environmental Quality/Virginia Department of Conservation and Recreation*  
*Contact: Laura McKay, Virginia Coastal Program, 804.698.4323*  
*February 1997*  
*1994 Task 2.11*





## Public Education



### Boat Holding Tank Pump-Out Facilities in Virginia

This list, compiled by the Virginia Department of Health, identifies marinas and other boat-mooring places that are equipped with pump-out facilities. The list is updated annually. More than 1,000 aluminum signs were provided to marinas and other facilities to promote the use of pump-out and dump stations.

*Virginia Department of Health*  
Contact: Cal Sawyer, 804.786.1755  
January 1991  
1990 Task 2



### Demonstration of Marina Pump-Out Facilities

This program detailed the success of demonstration pump-out facilities for use by local boaters. Demonstration units purchased through this grant are moved around to various coastal marinas. Among the sites where units have been located are Portside in Portsmouth, Leesylvania State Park, the Hopewell Yacht Club, and Onancock Public Dock in Accomack County.

*Virginia Department of Health*  
Contact: Cal Sawyer, 804.786.1755  
March 1991  
1989 Task 14



### Marine Debris Placard

Produced as part of the Middle Peninsula's Marine Debris Program, this placard, waterproofed for use on boats, tells boaters how to comply with federal and state regulations regarding overboard dumping. It is distributed to boaters free of charge. The program also includes Bay/river/stream cleanup projects.

*Middle Peninsula Planning District Commission*  
Contact: Jim Uzel, 804.758.3211  
October 1993  
1992 Task 58



**Don't Throw It! Stow It!**  
**BOATS 26 FEET OR LONGER MUST DISPLAY THESE REGULATIONS**

**ILLEGAL TO DUMP**

**INSIDE 3 MILES**  
AND IN U.S. LAKES, BAYS,  
RIVERS AND SOUND

**PLASTIC, DUNNAGE, LINING  
AND PACKAGING MATERIALS  
THAT FLOAT, ANY GARBAGE,  
EXCEPT GRAYWATER AND  
FRESH FISH PARTS**

**3 TO 12 MILES**

**PLASTIC, DUNNAGE, LINING,  
AND PACKAGING MATERIALS  
THAT FLOAT, ANY GARBAGE  
NOT GROND TO LESS THAN  
ONE SQUARE INCH**

**12 TO 25 MILES**

**PLASTIC, DUNNAGE, LINING,  
PACKAGING MATERIALS THAT  
FLOAT**

**OUTSIDE 25 MILES**

**PLASTIC**

**STATE AND LOCAL  
REGULATIONS MAY  
FURTHER RESTRICT  
THE DISPOSAL OF  
GARBAGE**

**CONTACT VMRC  
(804) 247-2200**

**EACH VIOLATION OF  
THESE REGULATION  
MAY RESULT IN CIV  
PENALTIES UP TO  
\$25,000, CRIMINAL  
PENALTIES UP TO  
\$50,000 AND  
IMPRISONMENT UP  
TO 5 YEARS**

**MIDDLE PENINSULA  
PDC (804) 758-2312**

## Public Education

### Virginia Beach Agricultural Reserve Program Public Opinion Survey

The farmland surrounding the North Landing River Preserve in Virginia Beach is some of the most productive in Virginia and a valuable open space area. It not only provides a buffer to the Preserve, but also constitutes a rural way of life in a rapidly urbanizing area of southeastern Virginia. Agriculture is an important local industry in Virginia Beach, but City's Green Line Policy (the extent of infrastructure development), which has been used as a way to manage growth in the City, has been difficult to enforce. There is an increasing incompatibility between residential development and agricultural activities.

At the request of the City Council of Virginia Beach, the Nature Conservancy was asked to conduct a public opinion poll in the Fall of 1994. The purpose of the poll was to assess the attitudes of the citizenry towards a proposed purchase of development rights program and future land use policies. The poll also assessed citizen's attitudes regarding southern Virginia Beach's natural cultural and agricultural assets. The poll showed overwhelming support for the creation of an Agricultural Reserve Program, a strong concern about growth in Virginia Beach, and strong support for maintaining family farms in Virginia Beach. Those polled also expressed a strong desire to save natural areas and open space. The poll showed that 88% of voters believe that if natural areas and open space are not saved now, they will be lost forever, and 93% believe that the natural areas of Virginia Beach are part of their heritage and the people owe it to their children and grandchildren to preserve it.

As a result of the poll, the Virginia Beach Agricultural Reserve Program was adopted by the Virginia Beach City Council and funded in May of 1995. The program, which may affect 20,000 acres of prime farmland in the southern watersheds of Virginia Beach, is a voluntary program that allows for the sale of development rights by farmland owners, in return for working capital which can then be reinvested in the farm. Purchases made through the program are reviewed after a minimum of 25 years. The review board has an option of selling back the rights, at market value, to the farm owner. Fourteen other states have used this program to great success.

*The Nature Conservancy/City of Virginia Beach*  
Contact: Michael Lipford, 804.295.6101  
October 1994  
1993 Task 2.4



### Advanced Internet and World Wide Web Training for Coastal Resource Managers

The Chesapeake Bay National Estuarine Research Reserve System (CBNERRS) at the Virginia Institute of Marine Science held a series of introductory and advanced Internet training workshops for coastal resource managers. Workshop participants were led in on-line demonstrations, introduced to the basics of HTML language and home-page development, and given training in forming efficient information searches, downloading and data handling procedures. Questionnaires were distributed to participants prior to the workshop to determine their specific information needs. The positive response to the introductory workshops led to the offer of advanced training. CBNERRS is currently working with the Coastal Program to develop and distribute an Internet survey to resource managers throughout the coastal zone to assess their Internet and WWW link status, and determine what specific information needs exist.

*Virginia Chesapeake Bay National Estuarine Research  
Reserve (CBNERRS)*  
Contact: David Niebuhr, 804.642.7144  
December 1996  
1995 Task 71



*See also:*  
Habitat & Wildlife Management, page 76:  
*Conservation Plan for Marine Mammals and Sea Turtles  
in Virginia*, article - *Swimming Beyond Boundaries*

*For more information on the Agricultural Reserve  
Program, contact Mary Heinrich, Southeastern Association  
for Virginia's Environment, 804.460.0750*



# Shoreline Management



# Shoreline Management

## Coastal Primary Sand Dunes and Beaches Guidelines

As stated in the Code of Virginia, coastal primary sand dunes, in their natural state, serve as protective buffers to the effects of flooding and erosion caused by coastal storms, and protect life and property. Sand dunes help replenish sand on beaches, provide habitat for coastal fauna, and contribute to the overall scenic and recreational attractiveness of Virginia's coastal environment. Activities that do not take into account the dynamic nature of coastal sand dunes, and which compromise their special values, may lead to increased shoreline erosion, coastal flooding damage to fixed structures, and increased expenditure of public funds for disaster assistance and beach replenishment. Through the Coastal Primary Sand Dune Act the General Assembly established a policy of preserving and protecting, whenever necessary and practical, coastal primary sand dunes in a manner which accommodates necessary economic development. Building upon the successful structure of the Virginia Wetlands Act, the General Assembly offers localities and local wetlands boards the opportunity to adopt a specified ordinance to control development in these dunes areas.

In order to ensure greater uniformity of decision-making, the **Coastal Primary Sand Dunes/Beaches Guidelines** were published by the Virginia Marine Resources Commission, with assistance from the Virginia Institute of Marine Science, in 1980 to provide guidance and necessary criteria to local wetlands boards and the general public in shaping shorefront development in a manner that preserves and protects the values of coastal primary sand dunes articulated in the Act. In 1989, the General Assembly modified the Coastal Primary Sand Dune Act to bring "beaches" in certain counties, cities and towns fronting the Chesapeake Bay under the same regulatory process as that required of dunes. Revisions to the laws of Virginia Relating to Submerged Lands, Wetlands and Coastal Primary Sand Dunes and Beaches are also reprinted and issued by the Marine Resources Commission.

*Virginia Marine Resources Commission  
Contact: Tony Watkinson, 757.247.2255  
September 1980, reprinted September 1993  
1992 Task 9*

## Beneficial Uses of Dredged Material from the Waterway on the Coast of Virginia

The goal of this project was to develop a plan for the beneficial use of sandy material dredged from the waterway on the coast of Virginia on the Eastern Shore. A series of maps, figures and tables illustrating the dredging history of the channels, placement areas, sediments to be dredged, and adjacent natural resources, such as shellfish beds and colonial waterbird nesting areas that might possibly be affected were produced. Benthic community impacts from these dredging practices and their recovery over time were also evaluated.

All of these components were then integrated into a beneficial use evaluation process. This process sought to identify the placement alternatives that would minimize potential adverse impacts and maximize the potential to improve habitat conditions in a manner that was both feasible and cost effective.

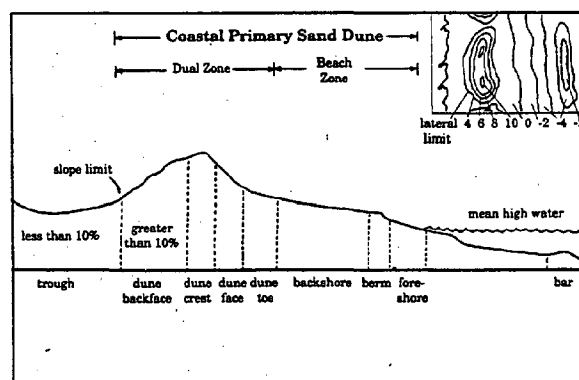
*Virginia Institute of Marine Science/Virginia Marine Resources Commission*

*Contact: Walter Priest, VIMS, 804.642.7385/*

*Chris Frye, VMRC, 757.247.2200*

*May 1996*

*1993 Task 15 (Phase I) 1994 Task 20 (Phase II)*



# Shoreline Management

## Shoreline Development BMP's

The concept of incorporating cost-effective conservation measures into project design is not new. During the permit process, a variety of Best Management Practices (BMPs) are often recommended by various regulatory and advisory agencies for specific projects. These measures have the combined effect of helping to ensure project integrity for the design life of the structure, while minimizing the potential adverse impacts associated with construction. While many BMPs exist for various construction and land use projects, there had not been a concerted effort to compile and consolidate existing shoreline development activities with standard practices and conditions. This document provides a comprehensive view of typical BMPs which can be readily applied to shoreline development projects, reducing both direct and indirect impacts to wetlands, water quality and marine resources.

*Virginia Marine Resources Commission*  
Contact: Tony Watkinson, 757.247.2200  
December 1992  
1991 Task 17  
❖

## SHORELINE EROSION PROBLEMS? Think Green . . .

Control shoreline erosion, help restore the Chesapeake Bay and save money all at the same time.



If you have low to moderate shoreline recession problems, establishing marsh vegetation can provide long term shoreline stabilization at a fraction of the cost of conventional structures such as bulkheads and rock revetments. Additionally, no permits are required in many cases. A significant benefit to this "green" approach is the enhancement of Chesapeake Bay water quality and habitat availability.

See: Public Education, page 52:  
*Nonstructural Alternatives for Shoreline Stabilization*

## The Progression of "No-Discharge Zone" Status in Water Bodies Across the Continental United States

This report presents a comprehensive review of regulatory statutes in states enforcing "no discharge" zones. A large-scale inventory of environmentally sensitive areas for consideration in the delineation of "no-discharge" zones within Chesapeake Bay waters is also included. A large digital database was designed in an Arc/Info Geographic Information System format.

*Virginia Institute of Marine Science*  
Contact: 804.642.7000  
March 1993  
1991 Task 20  
❖

## Potential Establishment of No Discharge Zones in Virginia's Coastal Waters

This project studied the feasibility of developing a No-Discharge Zone program for Virginia's coastal waters. A study group attempted to develop an ecological basis and criteria for selecting no-discharge zones. The group discovered the need for further research or study, including a need to update Environmental Sensitivity Index maps and research ways to develop educational partnerships with boat manufacturers and dealers.

*Virginia Department of Environmental Quality*  
Contact: Collin Powers, 804.698.4324  
December 1993  
1992 Task 10  
❖

# Shoreline Management

## Chesapeake Bay Wave Climate Reports and Summary of Wave Observations

**Wolf Trap Wave Station** - In order to systematically study the hydrodynamic processes that affect recreational, shoreline, and benthic resources, this study characterizes the local wave climate through the collection of a representative series of wave observations at Wolf Trap during 1989 and 1990.

**Chesapeake Light Tower** - This report details the upgrade of a system previously used to monitor and collect directional wave measurements at a U.S. Coast Guard navigational aid facility located 14 nautical miles east of Virginia Beach, Virginia. The new gage system uses a cellular phone network that enables data to be directly transmitted to the Virginia Institute of Marine Sciences.

**Thimble Shoals Wave Station** - This report details the initial findings of a two-year wave monitoring project in the Chesapeake Bay. It offers a systematic study of hydrodynamic processes that affect recreational shoreline and benthic resources in the coastal zone of the Commonwealth. This study also provides a description of a directional wave gaging system, known as a "Star" gage, that is designed for long-term, low-maintenance operation outside the Chesapeake Bay entrance.

*Virginia Institute of Marine Science  
Contact: John Boone, 804.642.7000  
March 1991, March 1993, February 1992  
1989 Task 11, 1991 Task 19, 1990 Task 9*



## Shoreline Erosion Assessment Software

This report focused on the erosion of upland or fastland regions along the shores of the Chesapeake Bay. It details the development of the Shoreline Erosion Assessment Software (SEASware) which evaluates shoreline conditions and provides a recommendation as to the need for a defensive structure along the base of the fastland bank.

*Virginia Department of Conservation and Recreation/  
Virginia Institute of Marine Science  
Contact: Lee Hill, DCR, 804.786-7119/  
Scott Hardaway, VIMS, 804.642.7277  
November 1992  
1991 Task 12*



## Satellite Locational Equipment and Survey System

The first of these projects funded the purchase of two 4000 SSE LAND SURVEYOR II receivers, and evaluated the use of Global Positioning System equipment for surveying on the outer, more remote islands and meadowlands of the Commonwealth, particularly Cedar Island off the Atlantic coast of Virginia's Eastern Shore. An additional receiver, software and accessories were later purchased to survey and map specific areas of Virginia's coast. Remote areas that are vulnerable to storms and coastal erosion and washovers, which obliterate traditional landmarks and references, were surveyed with very high accuracy.

*Virginia Marine Resources Commission  
Contact: Gerald Showalter, 757.247.2225  
November 1994  
1992 Task 25, 1993 Task 18*



## Design Wave Information for the Chesapeake Bay and Major Tributaries

Excessive water levels and accompanying wave action during storms cause shoreline erosion at many locations along Virginia's 5,000 miles of shoreline. The Shoreline Erosion Advisory Service (SEAS) of the Department of Conservation and Recreation is responsible for giving advice to private property owners around the Bay about shoreline stabilization alternatives. The economic design of each stabilization alternative depends on wave energy at the site and the value of the property. This study used historic wind data analysis to hindcast simple wind-generated wave growth formulas within the Automated Coastal Engineering System. The end product is a set of 12 wave information maps which will help SEAS improve the accuracy and consistency of their shoreline erosion control advice. The maps are not recommended for specific design use for coastal engineering problems.

*Virginia Department of Conservation and Recreation/  
Old Dominion University  
Contact: Dave Basco, ODU,  
Coastal Engineering Program, 804.642.7121/  
Lee Hill, DCR, 804.786.7119  
March 1994  
1992 Task 18*

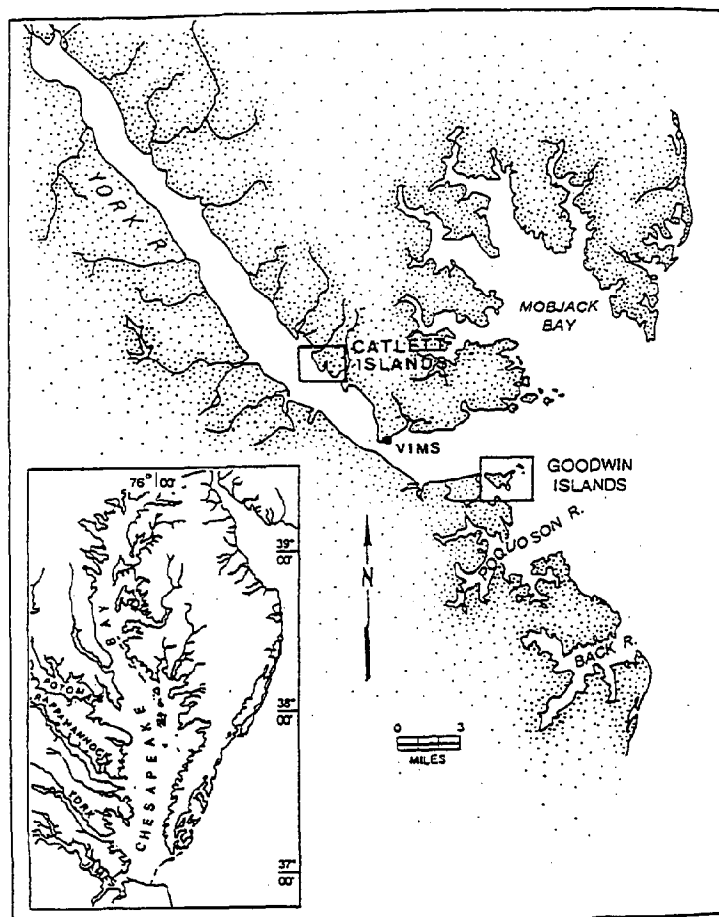


# Shoreline Management

## Hydrodynamics of Sediment Suspension in the Littoral Zone of the Lower York River

The objective of this project was to develop a practical method of predicting suspended sediment loading in the shallow water of estuarine shorelines. These are regions in which bottom sediment, in the absence of vegetative cover and depending on grain sizes present, has the potential to be actively eroded and entrained in the water column by wind waves and/or currents. This process impacts water quality by promoting nutrient enrichment and by reducing the amount of light available to submerged aquatic vegetation which provides critical habitat.

A program of field measurements-made in the spring-summer of 1995-evaluated both wave-driven loadings and current-driven loadings at two sites: Goodwin Islands and Catlett Islands. The resulting data were used to establish a working boundary-layer model capable of predicting time-varying vertical distribution of suspended sediment given local knowledge of sediment grain size, bottom roughness, wave direction and tidal flow parameters.



Location of VIMS Study Sites on the York River

An interim report was published in January 1996 (1994 Task 11) which includes a bottom sediment survey; directional wave monitoring; and wave, current and suspended sediment monitoring at the Goodwin Islands site. Included with this report is an assessment of observed correlations at various time scales: suspended sediment concentrations correlated with time-varying wave and current parameters; and, wave parameters correlated with wind speed and direction. A similar set of tasks was repeated for the Catlett Islands site in the spring and summer of 1996. The Catlett Islands results are given in a report published in December of 1996 (1995 Task 11).

*Virginia Institute of Marine Science  
Contact: John Boon, 804.642.7272  
January 1996 (Goodwin Islands),  
December 1996 (Catlett Islands)  
1994 Task 18, 1995 Task 11*



# Shoreline Management

## Stafford County Shoreline Protection Report

Stafford County's shoreline is a valuable resource with a diversity of features ranging from steep sandstone bluffs to broad freshwater marsh systems. Much of the shoreline has suffered from severe erosion. This report was developed to encourage management, protection and stabilization of the shoreline area in a manner that will protect natural resources and limit the loss of property and wildlife habitat. This report focuses on the Potomac River shoreline and the Aquia Creek shoreline. The report contains an inventory of shoreline development over twenty years (compiled in GIS format), aerial photographs and videotape, an overview of various shore protection goals and strategies, a Wave Climate Analysis, and a shoreline assessment. An initial shoreline management plan was developed by the county in 1991 with Coastal Program funding.

*County of Stafford*  
*Contact: William Shelly, 703.659.8688*  
*September 1995*  
*1993 Task 69*



## Westmoreland County Comprehensive Plan Shoreline Resources Chapter

As an element of its development of a Shoreline Resources chapter, Westmoreland County prepared an informational database to analyze general land use policies and individual land use decisions. It provides inventories, analysis, and maps of the following items: 1) aquatic resources, 2) major land use adjacent to the shoreline, 3) water-dependent facilities, 4) public access areas, and 5) shoreline erosion and accretion.

*Westmoreland County*  
*Contact: Steve Gunnells, 804.493.0120*  
*September 1991,*  
*Shoreline Resources Chapter Adopted*  
*May 1992*  
*1990 Task 69*



## Tidal Shoreline Erosion in Northern Virginia

The purpose of this project was to assist the Shoreline Erosion Advisory Service (SEAS) at the Department of Conservation and Recreation by updating two previous shoreline erosion reports on Northern Virginia prepared by the Virginia Institute of Marine Science. (See page 59 this section.) The updated report highlights areas of significant erosion, as well as the locations and types of erosion control structures situated along the Northern Virginia tidal Potomac shoreline and its embayments. The report references a computer data file that contains the names, mailing addresses, and tax parcel numbers for the nearly 700 Potomac River shoreline property owners. This information has to be used by SEAS as a public outreach tool.

*Northern Virginia Planning District Commission*  
*Contact: David Bulova, 703.642.0700*  
*September 1992*  
*1991 Task 64*



## Hampton Roads Regional Shoreline Element of Comprehensive Plans

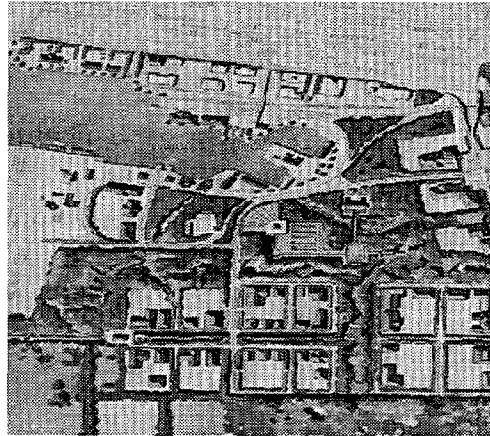
The Hampton Roads Planning District Commission assisted the region's 15 local governments in complying with the comprehensive plan requirements of the Chesapeake Bay Preservation Act to address shoreline uses and resources. The report produced includes a comprehensive inventory of shoreline resources and conditions, including shoreline features, oceanographic characteristics, water quality, sensitive living resources, and land use characteristics – shoreline structures, and public and private access sites. The importance of this information during comprehensive planning is discussed. Shoreline erosion control and access issues are identified and policy options for addressing them are presented. General policy recommendations for shoreline management are provided.

*Hampton Roads Planning District Commission*  
*Contact: Jeryl Rose Phillips, 757.420.8300*  
*March 1994*  
*1992 Task 55*



*See Also:*  
*Public Education, page 69:*  
*Nonstructural Alternatives for Shoreline Stabilization*

# **Special Area Management Plans**



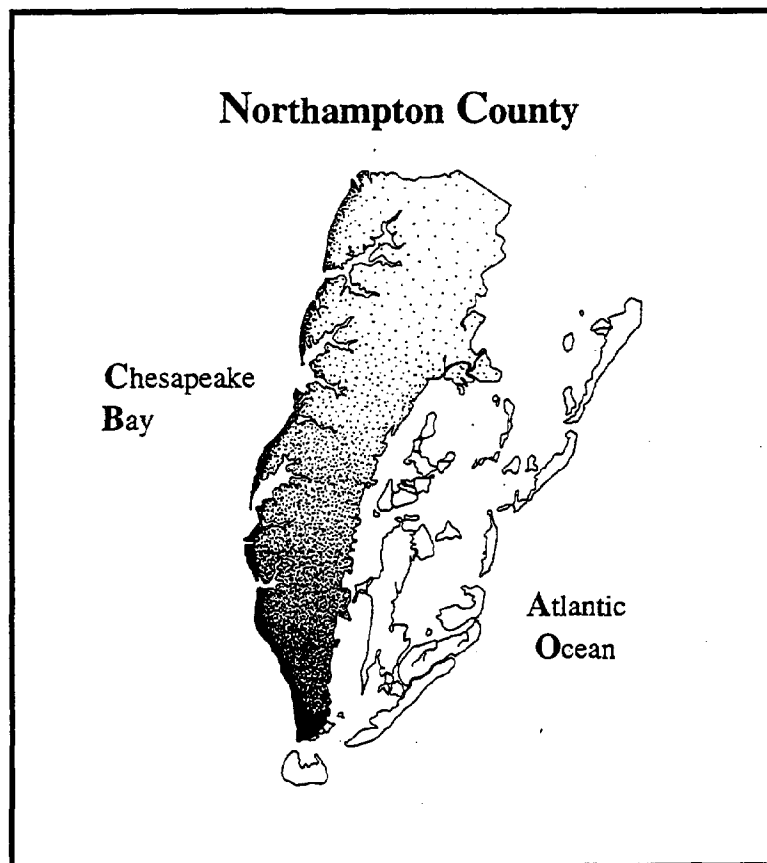
# Special Area Management Plans

## A Special Area Management Plan for Northampton County

Northampton County, the southernmost county on Virginia's Eastern Shore, forms the gateway to the Chesapeake Bay. It is a rural, agricultural county brimming with a wealth of unique natural and cultural resources, yet suffers from a depressed economy and chronic unemployment. The county provides habitat to over 260 species of birds and countless other fish and wildlife, and a chain of pristine barrier islands, the reasons for its designation as a World Biosphere Reserve by the United Nations. The County's traditional settlement pattern of compact villages and towns surrounded by productive land and water remains intact and shoreline vegetation provides critical food and habitat for millions of neotropical songbirds migrating along the East Coast each fall on their way to the tropics.

Now in its sixth year, the plan was developed by the Virginia Coastal Program in December 1991 with input from federal and state agencies, Northampton County planning staff, and nonprofit groups. The Northampton County Special Area Management Plan (SAMP) became known and adopted by the county's citizens as the County's Sustainable Development Action Strategy. A Director of Sustainable Development, hired in 1993 by the Coastal Program, coordinates the SAMP's county-wide activities, with the assistance of a Sustainable Development Task Force.

The Northampton SAMP has several goals: 1) *to develop new, enforceable policies to protect bird and fish habitats and control cumulative and secondary impacts of coastal development by maintaining maximum vegetative cover for wildlife habitat and nutrient uptake; and 2) to develop new, sustainable industries and protect a sense of place and quality of life, and to develop responsible heritage tourism, aquaculture and other sustainable industries.* (continued on page 63)



Note: The shading on this map illustrates the concentration or "funneling" of neo-tropical migratory birds through Northampton County and its neighbor, Accomack County, during fall migration.



## Special Area Management Plans

The Special Area Management Planning (SAMP) proposed modifications of County zoning and subdivision ordinances and development of a stormwater ordinance; development of seaside farm conservation easements; designation of Tier III or "Exceptional State Waters"; Memoranda of Understanding on appropriate public access, power line right-of-way and rural road standards to maximize native vegetation; and permit guidelines for aquaculture.

*Habitat Protection Ordinances and Power Line Memorandum of Understanding (MOU):* Zoning, subdivision and cluster development ordinances have all been written and are before the public. Although scientists recommended an overlay zone for migratory songbirds, County officials preferred County-wide ordinances because of the water quality benefits to be gained as well as habitat benefits from maximizing vegetative cover. Adoption of these ordinances has not yet come to a vote by the Board of Supervisors. MOU between Delmarva Power, Northampton County and the Virginia Department of Conservation and Recreation is being developed. Work in the 1996 grant will include: an inventory of rare plants occurring in the power line rights-of-way, identification of best management practices to protect rare plants, and replanting grass areas with low-growing native vegetation beneficial to wildlife and water quality. These practices should reduce or eliminate the need for mowing and herbicide use.

*Water Quality Policies:* A stormwater ordinance has been drafted and is before the public for review. Early on it became clear that aquaculture would be precluded in Tier III "Exceptional Waters" under the Clean Water Act. "No additional discharges" included no discharges from aquaculture hatcheries. The citizen group working on this effort instead began work on a more tailored approach; i.e. exceptional waters conservation easements. A model easement is being developed that would preclude any new discharges from the property except for aquaculture and crab shedding.

*Public Access Memorandum of Understanding (MOU):* Although an MOU has not yet been drafted, progress has been made in setting the stage for an MOU to be readily accepted by the proposed signatories. The goal is to have major public landowners (USE&WS, Virginia state agencies and Northampton County) agree on where public access should be encouraged and discouraged; create an Ecotourism Code of Ethics and a voluntary Ecotour guide certification program. Section 306 funds have been awarded to the Department of Conservation and Recreation to complete a barrier island bird conservation plan and an ecotour guide certification curriculum for the Eastern Shore.

*Aquaculture Permit Guidelines:* During the 1995 or 1996 grant year, progress began on aquaculture permit guidelines. In 1995 the General Assembly demonstrated the political will to act by requesting that the Virginia Marine Resources Commission study its organic statutes and regulations to identify barriers to aquaculture development. In October 1996 the Coastal Program contracted with VMRC to use Section 309 funds to develop a new permitting system for aquaculture. This work has just begun and will continue using Section 309 funds through FY'99.

Development of the Northampton SAMP has led to the leveraging of nearly \$3 million in additional funds from outside the Virginia Coastal Program. Northampton received grants from the U.S. Department of Transportation for ISTEA projects to restore historic sites and create a "Heritage Trail", from EPA for a brownfields/greenfields and habitat restoration project at the Cape Charles Eco-Industrial Park, and from the U.S. Department of Agriculture and the Economic Development Authority for infrastructure construction at the park. Additionally, the Coastal Program secured a grant from the U.S. Fish and Wildlife Service for a habitat preserve within the park, and is also funding habitat restoration and a boardwalk within the park's preserve. (1997 Task 54) The Northampton SAMP is expected to be completed by March of 1998.

*Northampton County/Virginia Department of Environmental Quality*

*Contact: Tim Hayes, 757.331.1998, or Laura McKay, 804.698.4323*

*Current Ongoing Activity*

*1992 Task 92.1, 1993 Task 92.1, 92.2, & 92.3, 1994 Task 92.1 & 92.3,*

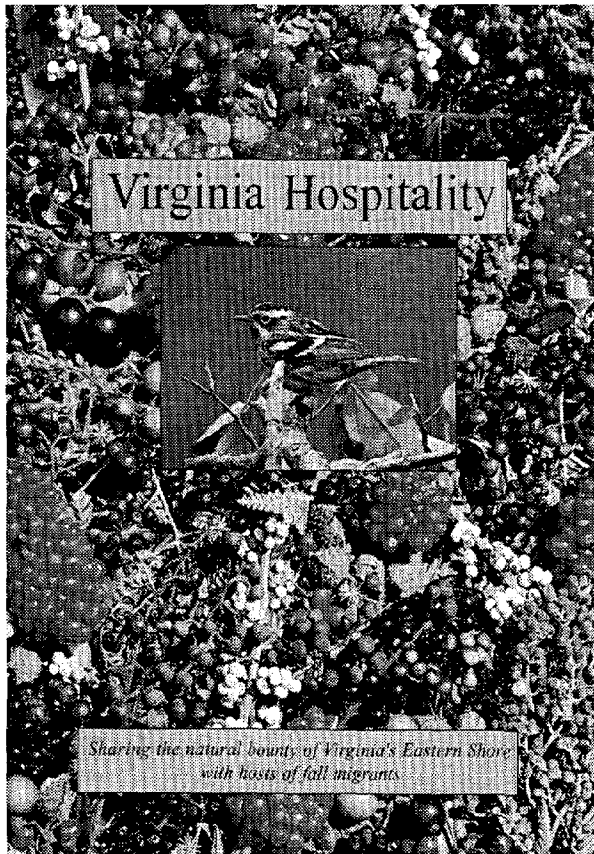
*1995 Task 92.1 & 92.3, 1996 Task 92*



# Special Area Management Plans

## Migratory Bird Habitat Requirements

Before songbird habitat protection policies could be developed for the Northampton SAMP, it was necessary to scientifically document habitat needs. Two fall field seasons of population distribution data were collected and analyzed by Virginia's Departments of Conservation and Recreation and Game & Inland Fisheries. This data shows that neotropical migratory songbirds are most concentrated in the lower 10 km (6.5 miles) of the peninsula and stay within .5 km (3.25 miles) of the waterfront. Scientists recommended an overlay zone that would restrict removal of dense understory vegetation in this area. Migratory songbird populations are highly dependent on dense understory for cover from predators. They also forage in these understory areas for insects, fruits and seeds which provide them with the energy they need for their long distance flights to the tropics.

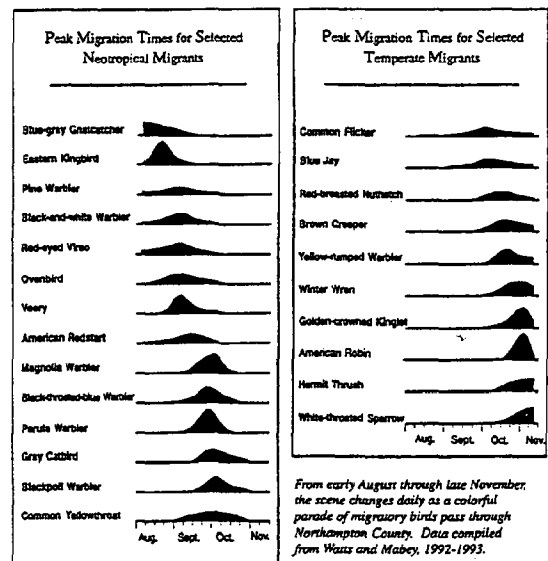


This popular publication was published by the Center for Conservation Biology at William and Mary, in association with the Kestrel Foundation, as part of the Virginia Coastal Program's SAMP funding to Northampton County (1993 Task 92.3). This colorful booklet, produced for the general public, contains beautiful photos of neotropical migrants and raptors and information on migration patterns, habitat requirements, and current efforts to conserve and protect fall migrants and essential bird habitat on the Delmarva Peninsula. Copies of this publication can be obtained by calling the Center for Conservation Biology at the College of William and Mary.

## Northampton County Migratory Bird Habitat Utilization Study

A three year study by the Natural Heritage Program at the Department of Conservation and Recreation and the Department of Game and Inland Fisheries to determine the use of Northampton County's vegetation, habitat, and landscape by migratory songbirds began in the summer of 1992, following the interstate migratory songbird coastal corridor study, **The Neotropical Migratory Songbird Coastal Corridor Study**. (See Habitat and Wildlife, page 24.) The data collected was used to develop scientifically sound recommendations for the local ordinances to be adopted under the SAMP. Federal and state agencies are also using the information for their conservation programs.

Virginia Department of Game and Inland Fisheries/  
Virginia Department of Conservation and Recreation  
Contact: Tom Smith, DCR, 804.786.7951  
September 1993 (Phase I), December 1994 (Phase II)  
1991 Task 92.2, 1992 Task 92.4, 1993 Task 92.4



# Special Area Management Plans

## Barrier Island and Marsh Nesting Waterbird Survey

An aerial and boat survey was conducted of colonial waterbird nesting sites using hand held Global Positioning System units. This project was also conducted to gather information to support the Northampton SAMP. Hard copy maps and digital data layers, suitable for entry into Arc/INFO GIS, of the barrier island and marsh nesting sites were produced.

*Virginia Department of Game and Inland Fisheries/The  
Nature Conservancy (TNC)*

*Contact: Barry Truitt, TNC, 804.442.3049*

*November 1993*

*1992 Task 92.5*



## Migratory Bird Habitat Public Education & Policy Development

This SAMP project continued the work of the Department of Conservation and Recreation's Natural Heritage Division, the Center for Conservation Biology of William and Mary and the Virginia Department of Game & Inland Fisheries. The project developed a migratory bird field training program and slide show for resource managers and a land management guide for private landowners and local realtors and developers. Critical migratory songbird concentration areas were added to the county geographic information system.

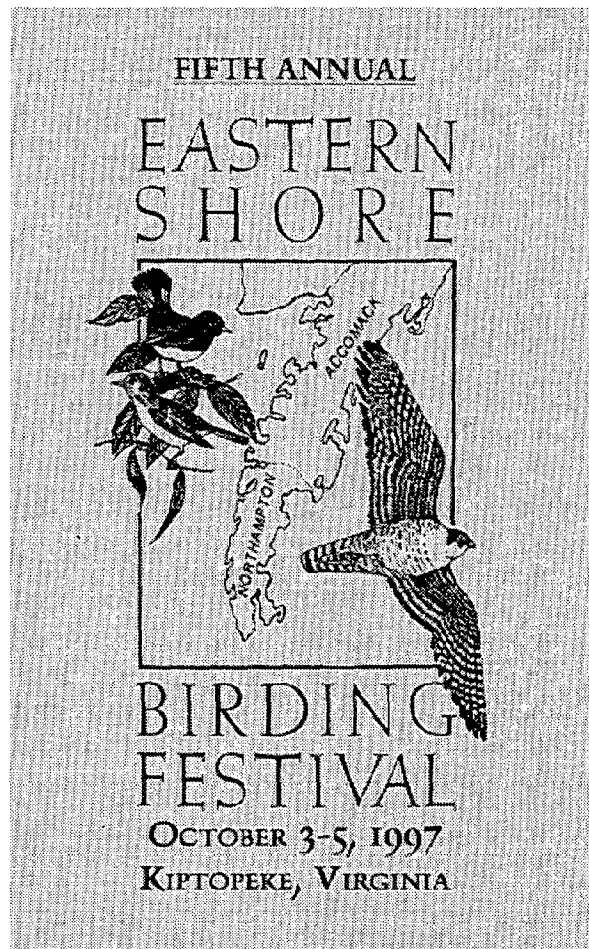
*Virginia Department of Conservation & Recreation/  
Virginia Department of Game and Inland Fisheries*

*Contact: Laura McKay,*

*Virginia Coastal Program, 804.698.4323*

*March 1996*

*1994 Task 92.4*



## Annual Eastern Shore Birding Festival

Now organized and hosted by the local Chamber of Commerce, the Eastern Shore Festival was initiated by the Coastal Program as a SAMP activity. The Birding Festival, headquartered at the southern tip of the county each fall, has been a successful demonstration of responsible ecotourism. According to the economic analyses of the festivals, several hundred thousand dollars have been brought into the county since 1993. The Festival celebrates the fall bird migration and generates substantial interest among birdwatchers nationally and internationally. The festival demonstrates the importance of habitat preservation and ecotourism's economic potential.

*Northampton County/Virginia Eastern Shore  
Chamber of Commerce*

*Contact: David Parker, 757.787.2460*

*1992 Task 92.1, 1993 Task 92.3, 1994 Task 2.7,*

*1995 Task 2.3, 1996 Task 92*



# Special Area Management Plans

## Cape Charles Sustainable Technologies Industrial Park

Northampton County was selected from among 400 nationwide applicants as one of four locations in the United States for a model eco-industrial park by President Clinton's Council on Sustainable Development. A community design charrette (planning session) was held and a master plan for the Port of Cape Charles Sustainable Technologies Industrial Park (STIP) was created as part of the Northampton SAMP. The Master Plan was developed by the University of Virginia's School of Architecture. Over 100 Cape Charles residents contributed to the design. The first tenant, Solar Building Systems (a Swiss-based company) has hired 25 local workers.

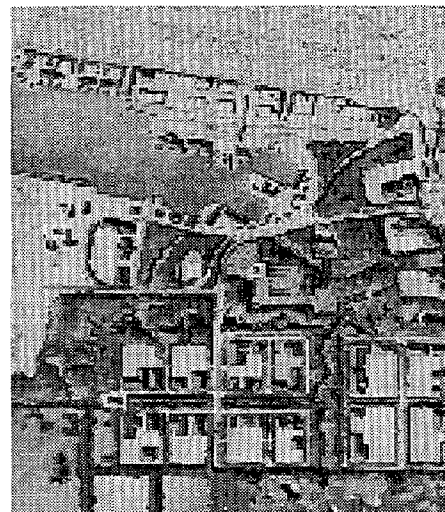
As part of its 1996 Coastal Program grant award, the County will complete additional, more detailed plans for various components of the Park including a retreat/conference center which will help promote the area as an ideal location for sustainable industries. The park will include a zero-emission water recovery/recycling system, a coastal dune habitat preserve, protective covenants for tenant agreements and an African-American Heritage Center. The park will represent a microcosm of the larger Northampton SAMP goals.

*Northampton County*  
Contact: Tim Hayes, 757.331.1998  
1994 Task 2.5, 1994 Task 92.3, 1995 Task 92.3,  
1996 Task 92



Photo courtesy of Northampton County

One of the 25 local workers hired by Solar Building Systems, Inc., the first tenant of the Cape Charles Eco-Industrial Park.



Photo/Map courtesy of Northampton County

A portion of the Cape Charles Sustainable Technologies Park showing the park, on the southside of the harbor, and the Town of Cape Charles, on the northside of the harbor. Cape Charles will be an integral component of the park community.

## Promotional Video, Business Folder

A twelve minute film by Blue Earth Films (a company which has produced films for National Geographic and national public television) has been completed. The film, available on video cassette, describes the natural and cultural resources of the area, the sustainable development concept, and the Cape Charles Eco-industrial Park. The video, a business folder with specs on the Park and a poster of the Park have all been developed and used to attract companies to the area that will contribute to the sustainable development initiative.

*Northampton County*  
Contact: Tim Hayes, 757.331.1998  
March 1997  
1994 Task 2.9



# Special Area Management Plans

## Virginia's Seaside Farms: A Conservation Easement Program in Northampton County

The Nature Conservancy's easement program is designed to help protect the seaside wetlands included in the SAMP by ensuring that appropriate management measures are maintained on adjacent properties to provide buffers landward of the wetlands. Language was developed in this project for 10 seaside farm easements. The easement language requires the maintenance of dense understories and water quality protection BMPs on the farm. They also demonstrate how a farmer could develop a few clustered residences or guest cottages on the property to derive additional income without jeopardizing natural resources. When the properties are transferred, the easements will be recorded. A financial analysis model was developed and applied to illustrate that low impact development is an economically viable alternative for waterfront farms. A manual on developing seaside farm conservation easements was developed and is being used to encourage other seaside farm owners to record easements.

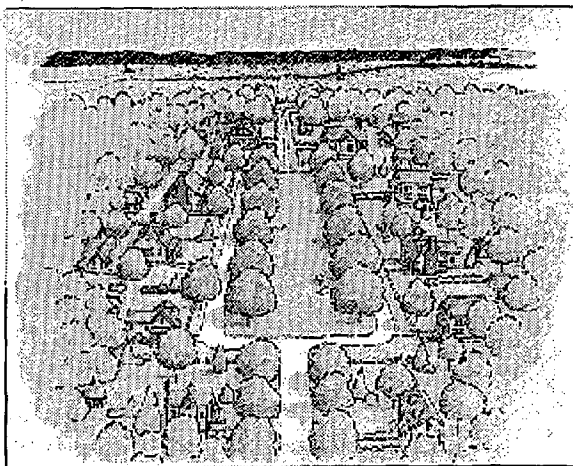
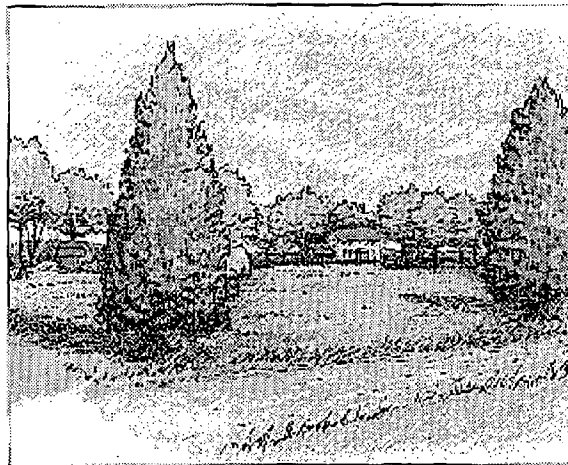
*The Nature Conservancy*  
Contact: Greg Lowe, 703.860.5388  
November 1992, February 1994  
1991 Task 93, 1992 Task 93



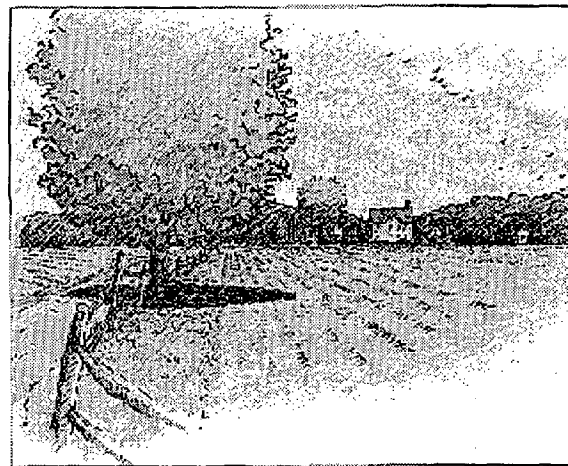
**Historic House Settlement:** The restoration of historic and traditional Eastern Shore dwellings is an integral part of the farm plan.



**Nature Settlement:** Wilderness dwellings are allowed in carefully selected areas maintaining farm, wetland and forestry resources.



**Farm Settlement:** From the ground level, the farm of the future will look much like the farm of the past.



**Town Settlement:** The farm of the 2050 might include a settlement adjoining an existing village.



# Special Area Management Plans

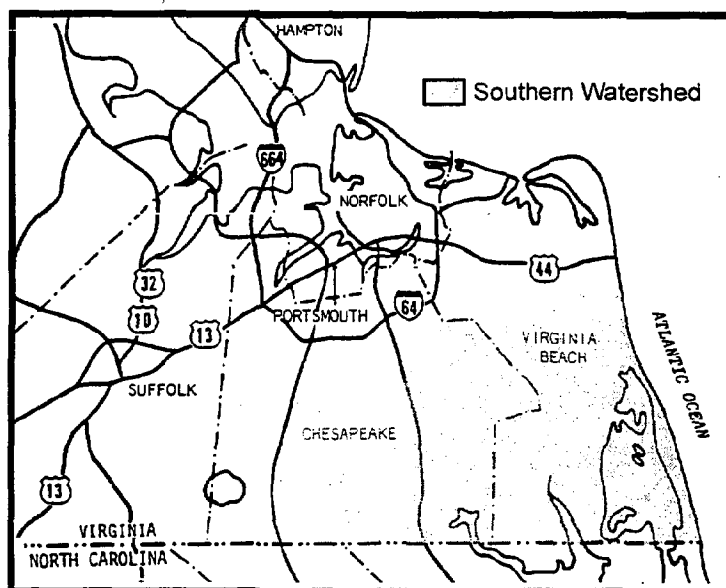
## Southern Watershed Special Area Management Plan

The Southern Watershed Area (SWA), located in Southeastern Virginia, is the focus of the Coastal Program's second SAMP effort. The SWA is bordered by the Atlantic Ocean on the east and the Great Dismal Swamp on the west. The northern portion of the area is dominated by urban land uses and is undergoing rapid development. The southern portion, adjacent to the North Carolina border, is rural and contains extensive wetlands that include a variety of rare swamp, pocosin and marsh communities, which drain into the southern portion of the Albermarle-Pamlico Sound. Land uses in the southern portion of the area are primarily agricultural, silvicultural and rural residential. The Northwest River is the primary drinking water supply for the City of Chesapeake. The area is also one of the most biologically diverse regions in the state, supporting more than 40 rare species and 10 terrestrial, estuarine and palustrine wetland communities. In 1728, William Bryd described this area as a "green sea" due to its broad expanses of undulating, tall, green reeds.

The primary coastal management problem facing the SWA is the need to preserve its significant natural resources in the face of an increasing population and development pressure. The bulk of the new development associated with this population increase will take place in the SWA. As development pressures increase in the SWA, a coordinated effort to manage the watershed is essential. The proposed Southern Watershed Special Area Management Plan (SAMP) will focus on the development of new and enhanced enforceable policies that protect significant wetlands habitat and water quality.

The SWAMP seeks to minimize the adverse impact of continued urbanization on the natural resources of the SWA by improving the range of tools available to Virginia Beach and Chesapeake to control new development. In addition, the SWAMP will highlight the economic value of the natural resources through the investigation of several sustainable economic development initiatives, including nature tourism and organic farming.

The Cities of Virginia Beach and Chesapeake, working in partnership with the Hampton Roads Planning District Commission and the Coastal Program, have created a significant foundation for the Southern Watershed Management Program (SWAMP). This work has included development of a mission statement and a set of goals and objectives. The mission statement is as follows: "Natural resources, sensitive lands, and water supplies of the southern watersheds of Virginia Beach and Chesapeake should be protected and enhanced." The goals include protection of water quality, preservation of open lands, ensuring compatibility of economic development and natural resource protection, maintenance of the rural character of the area, and preservation of agriculture and silviculture in the watershed.



# Special Area Management Plans

## A Special Area Management Plan for the Southern Watershed of Virginia

To accomplish its management goals, the Southern Watershed Special Area Management Plan (SWSAMP) will involve the development of several policies. These policies include: establishment of comprehensive mitigation strategies; refinement of preservation and conservation district provisions in the two cities; and development of memoranda of agreement among the agencies responsible for managing the southern watershed. The objectives of the memoranda are: to enhance a wildlife corridor system through conservation easements; develop a formal information exchange process; incorporate water quality data synthesized under the SAMP into urban and agricultural stormwater BMPs; and reduce waterway use conflicts. The SWAMP also includes research to support the policy changes, provisions for stakeholder involvement, and exploration of environmentally compatible industries such as nature tourism and sustainable agriculture. The following are key accomplishments of program to date: 1.) The creation of the Local Government Advisory Committee (LGAC) and the Water Quality Task Force (WQTF). These groups have fostered a strong working relationship among the entities responsible for managing the SWA. 2.) The development of a set of goals and objectives for the SWA as described on page 68. 3.) A Memorandum of Agreement (MOA) was signed by Chesapeake and Virginia Beach, formalizing the criteria for exchange of information on development projects in the SWA. In addition the MOA states that the two cities will support the previously mentioned goals and objectives for the SWA.

The SWAMP will receive Virginia Coastal Program support through September of 2000.

*Hampton Roads Planning District Commission  
Contact: Eric Walberg or John Carlock, 757.420.8300*

*April 1995, October 1996  
1993 Task 56, 1995 Task 59, 1996 Task 93*



## Dragon Run Watershed Management Plan

The Dragon Run Management Plan outlines ways to improve local management of the Dragon Run watershed through education of landowners and visitors; cooperation with state agencies in voluntary practices and enforcement of regulations; and new local initiatives to provide quality in design and function to new development in the area. These combined efforts should result in the sustained quality of the Dragon Run waters, forests, fields, and communities for both human settlement and nature preservation.

The Dragon Run Watershed Management Program consisted of a three year planning process which included the work of a citizen advisory board, the Dragon Run Steering Committee, and volunteer water quality monitors. GIS was used for land use and features analyses and a water quality nutrient model was developed.



*Middle Peninsula Planning District Commission  
Contact: Jim Uzel, 804.758.2311*

*September 1996  
1993 Task 59, 1994 Task 58, 1995 Task 62*



*See Also:  
Habitat & Wildlife Management, page 29:  
Monitoring Avian Migration at Kiptopeke State Park*

## Water Quality





# Water Quality

## Coastal Nonpoint Source Pollution Control Program

Development of the Virginia Coastal Nonpoint Source Pollution Control Program was initiated in the fall of 1992 in response to Section 6217 of the Coastal Zone Act Reauthorization Amendments of 1990. This statute requires that states with approved coastal resources management programs develop and implement coastal nonpoint source pollution control programs. Federal guidance issued in January 1993 specified management measures for sources of nonpoint pollution. These measures have to be implemented through state-enforceable laws and regulations in order for Virginia to continue to receive NOAA funding.

State laws and regulations in Virginia were assessed and reviewed for their applicability to guidelines issued by NOAA and EPA. A draft program document was submitted to NOAA and EPA in 1994. A series of public forums were attended by citizen and business groups, local and state representatives. Based on public input, and review comments from NOAA and EPA, a final program document was developed and submitted in 1995.

In August 1997, NOAA and EPA issued final draft findings and conditional approval for Virginia's Coastal Nonpoint Pollution Control Program pursuant to Section 6217 of the Coastal Zone Act Reauthorization Amendments of 1990. An Environmental Assessment was also released which assesses the environmental impacts associated with program approval and implementation. The Virginia program includes management measures for agriculture, forestry, urban development, marina and hydromodification nonpoint source categories, and for wetlands, riparian areas, and vegetated treatment systems.

The Commonwealth's proposed boundary for the 6217 management area was deemed sufficient to control the land or water uses that have or are reasonably expected to have a significant impact on Virginia's coastal waters. This boundary mirrors the coastal management area, Tidewater (as defined by Virginia Code), stretching from Arlington to Chesapeake and out to the Eastern Shore counties of Accomack and Northampton.

To receive approval of its program, Virginia will need to meet certain conditions, including 1) the development of a monitoring plan to assess over time the efficacy of a coastal nonpoint program, and 2) final development of certain program areas such as management of on-site sewage disposal, construction site chemical control and riparian restoration efforts.

*Virginia Department of Conservation and Recreation*

*Contact: Rick Hill, 804.786.7119*

*September 1995*

*1992 Task 81, 1993 Task 81, 1994 Task 81,*

*1995 Task 81 & 83*



# Water Quality

## Assessing Implementation of Water Quality BMPs by Marinas

Pollutant contribution from marina and boat operations represents only a small percentage of the total volume of pollutants being discharged annually into the Chesapeake Bay and its tributaries. Nevertheless, marinas are being increasingly scrutinized as potential problem areas due to their high visibility, their location at the land/water interface, the composition of pollutants common to marina and boat operations. Although a number of conservation agencies in the Commonwealth have regulatory authority over the various aspects of marina construction, oversight of day to day marina operations is not always clearly defined.

The study was conducted at 100 randomly selected marinas in the Tidewater area to investigate both the level and type of BMPs being used by marinas in the coastal zone. The primary focus of field investigations were on successful management practices to limit pollutant discharges. A survey was developed to gather site specific information regarding the current level of BMP applications, in-situ management measures, operator perceptions, and planned measures for further pollutant reductions. Marina operators were encouraged to discuss existing and planned BMP applications and indicate their preferences and opinions regarding the usefulness of various management measures in reducing discharges.

Most of the marina operations reviewed were in compliance with existing regulations issued by the Virginia Marine Resources Commission and the Virginia Department of Health, and were not far from achieving the nonpoint source pollution reduction goals of the Coastal Zone Management. Problems were found in the areas of boat maintenance and sewage pumpout.

Marina operators surveyed expressed the need for a marina extension agent who could provide technical expertise on existing and proposed regulations; assist marina managers in the development of stormwater protection plans, operating plans and BMPs for their facilities; and, who could coordinate marina trade organizations and regulatory agencies efforts to develop and implement a comprehensive boater education program addressing nonpoint source pollution control practices.

*Virginia Marine Resources Commission  
Contact: Tony Watkinson, 804.247.2255  
June 1996  
1994 Task 83*



## Drainfield Repair Resource Manual for Systems Failing in Virginia's Coastal Zone

The Drainfield Resource Manual, including a section funded by the Virginia Coastal Program, entitled The Systematic Evaluation and Repair of Failing Drainfields in the Coastal Zone, was developed to provide environmental health specialists with guidance on how to evaluate malfunctioning drainfields. The manual begins with methods to identify the causes of failure and how to evaluate the site for repair. It details long-lasting sewage system repairs that are cost effective and meet the needs of the public. The manual also contains supplementary materials on sand filters, low pressure systems and pressure irrigation drip disposal systems. Training classes were also held in 1991 and 1992 on drainfield failure, effective repair and advances in repair technology. The Drainfield Resource Manual is available on the Virginia Department of Health website at <http://www.vdh.state.va.us/oehs/onsite/training.htm>.

*Virginia Department of Health  
Contact: Don Alexander, 804.225.4030  
December 1992  
1991 Task 14*



## Evaluation of Urban NPS Pollution Control Alternatives

A range of innovative pollution prevention techniques was evaluated and compared to conventional techniques for nonpoint source management. Emphasis was placed on quantifying the effectiveness of these techniques for reducing urban nonpoint source pollution as they may be applied to the Four Mile Run watershed in Northern Virginia. The report produced quantifies the projected pollution prevention strategy alternatives for ten pollution prevention alternatives, and also provides cost information and projected cost-benefit rates for some of these alternatives. Results of this study are generally transferable for use by other urban localities, and all study methodologies are documented to facilitate replicability.

*Northern Virginia Planning District Commission  
Contact: Don Wayne, 703.642.0700  
February 1997  
1995 Task 65*



## **A PC-Based Tidal Prism Water Quality Model for Small Coastal Basins and Tidal Creeks**

An existing water quality model of small coastal basins and tidal creeks was refined and expanded to better simulate eutrophication processes and to be compatible with modeling efforts in main bay and major tributaries. The goal of the project was to provide, test, and demonstrate a generic water quality model for use by resource management agencies.

*Virginia Institute of Marine Science/  
Virginia Department of Environmental Quality  
Contact: Albert Kuo, VIMS, 804.642.7212  
September 1994  
1993 Task 13*



## **Application of a Tidal Prism Water Quality Model to the Lynnhaven River**

The Tidal Prism Model developed in 1993 was applied to the Lynnhaven River of Virginia Beach. It was demonstrated that the model can successfully simulate the eutrophication processes in the small coastal basins and tidal creeks. Two workshops were conducted to introduce the model to resource managers and regulatory agency personnel. A software package of the model was developed and made available to users. The agencies are actively pursuing opportunities to use the model for nutrient reduction strategies.

*Virginia Institute of Marine Science/  
Virginia Department of Environmental Quality  
Contact: Albert Kuo, VIMS, 804.642.7212  
September 1995  
1994 Task 19*



## **Field Studies in the Lynnhaven R. for Calibration of a Tidal Prism Water Quality Model**

The purpose of this project was to collect water quality data in the Lynnhaven River of Virginia Beach for calibration of the Tidal Water Quality Model which was developed under Task 13 in 1993. The Tidewater Regional Office of the Department of Environmental Quality has monitored the Lynnhaven River bi-monthly since 1975. Funding enabled the collection of supplemental data for purposes of evaluating critical parameters indispensable to model application.

*Virginia Institute of Marine Science/  
Virginia Department of Environmental Quality  
Contact: Albert Kuo, VIMS, 804.642.7212  
January 1995  
1993 Task 25*



## **Modeling Cumulative Impacts and the Carrying Capacity of Small Tidal Creeks and Inlets**

The purpose of this project was to identify pollutant loading values which might be used as input for a series of water quality models applied to small tidal creeks and inlets in Virginia's coastal plain. The intent was to identify values from literature sources which might be used in application of the models, absent better or more specific information. Estimates of biological oxygen demand, chemical oxygen demand and fecal coliform loadings were of specific interest.

This report provides a summary of values for both runoff coefficients and storm water runoff load estimates for total suspended solids, biological oxygen demand, coliform levels, chemical oxygen demand, total nitrogen and total phosphorus.

*Virginia Institute of Marine Science  
Contact: Carl Herslmer, 804.642.7387  
July 1995  
1993 Task 19*



# Water Quality

## Man Versus Mollusc: Studies of Water Quality Problems, How They Affect Shellfish and Shellfish Harvesting, and How the Commonwealth Should Address These Problems

The purpose of this study was to investigate the problem of water quality degradation and its effects on the shellfish industry, and make recommendations regarding the state's management of water quality and shellfish resources. Sources of point and nonpoint pollution potential were analyzed, with particular emphasis on bacterial pollution in the Chesapeake Bay watershed area. Several case studies illustrate the problem of water pollution in terms of human population growth and development, and the problems and trends encountered by other coastal states. This report recommends: establishing a program to designate "Shellfish Culture Areas"; promoting alternative methods of shellfish cleansing; and, reducing pollutant sources, especially sources of fecal pollution. Also discussed are more detailed recommendations to protect Virginia's shellfish growing areas and promote the shellfish industry.

*Shellfish Enhancement Task Force  
Virginia Institute of Marine Science  
Contact: 804.642.7000  
December 1991  
1990 Task 14*



## Anaerobic Pretreatment & Removal of Nutrients and Ammonia from Crab Processing Wastewater

The blue crab industry is one of the largest seafood processing industries in Virginia, and handles several million pounds of blue crabs each year. The industry is an important economic and cultural component of Virginia, but many of these small companies discharge wastewater that is high in biologically degradable matter directly into nearby water bodies. In order to maintain the quality of coastal waters, inputs of nutrients, which serve to accelerate eutrophication, and ammonia, which can cause toxicity problems, are being strictly regulated. Crab processing waters contain high levels of nutrients and ammonia, and therefore need to be treated rigorously before direct discharge to the environment. Access to municipal wastewater treatment plants for processing these waters is currently nonexistent to rural processing plants and may not be guaranteed in the future to those plants in municipal areas. Without appropriate options for wastewater treatment, many crab processing companies, and the individuals and businesses that rely on them, may be in danger of economic hardship or failure.

The objective of the first phase of these two projects was to design and test a treatment system that would be affordable and manageable for small processing companies but capable of removing high levels of oxygen-depleting substances and suspended solids. The Phase I report presents and discusses preliminary results from a bench-scale system.

The Phase II report rigorously analyzes a pilot plant in Hampton, Virginia. The Phase II report evaluates the use of an anaerobic process in series with ammonia stripping and/or an aerobic/anaerobic process for nitrification-denitrification of these crab processing waters.

*Virginia Polytechnic Institute and State University  
Contact: Gregory Boardman, 703.231.6020  
February 1994, November 1994  
1992 Task 24, 1993 Task 21*



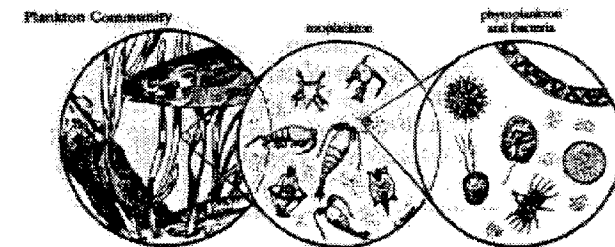
# Water Quality

## Nutrient Limitation in the Chesapeake Bay: Nutrient Bioassays in the Virginia Bay System

The purpose of this research was to extend the investigations of the role of nitrogen and phosphorus in controlling the abundance of algal biomass in the Virginia portion of the Chesapeake Bay system. Eutrophication resulting from anthropogenic inputs of nutrients is increasingly recognized as having a deleterious impact on water quality in the Bay and its tributaries. Potential or actual effects from over-enrichment with nitrogen and phosphorus include: a change in the phytoplankton species constituting the base of the food web with possible implications for the nature of the food web and harvestable sources; a decline in submerged aquatic vegetation resulting from reduced sunlight penetration by increased phytoplankton and epiphyte abundance; and, the exacerbation of hypoxia and anoxia in deep waters of the Bay resulting from increased phytoplankton abundance which is transported to the bottom waters and sediments and depletes oxygen during decomposition.

On the basis that scientifically sound and cost-effective nutrient management strategies in the Chesapeake Bay require a better understanding of the spatial and temporal patterns of nutrient limitation of phytoplankton growth, this study examined nutrient limitations at six stations in the lower Bay and its tributaries (Rappahannock and James Rivers, and the mainstem of lower Bay), which complemented similar studies that were underway in the York River and Maryland portion of the Bay.

*Virginia Institute of Marine Science*  
Contact: Leonard Haas, 804.642.7248 or Richard Wetzel,  
804.642.7381  
March 1993  
1991 Task 15



*Phytoplankton are tiny one-celled plants often occurring in colonies known as algae.*

## Virginia Citizen Water-Quality Monitoring Program

The Virginia Department of Environmental Quality, Chesapeake Bay Office, coordinates Virginia's Chesapeake Bay monitoring program and activities. The *Virginia Citizen Water Quality Monitoring Program*, a network of citizen volunteer monitors, established by the Alliance for the Chesapeake Bay in 1985, is an important component of the Commonwealth's Chesapeake Bay monitoring activities. Citizen volunteers play a valuable and cost-effective role in monitoring efforts in the Bay watershed and coastal waters. The Alliance manages a network of approximately 110 citizen water quality monitoring volunteers at close to 75 sites in the tidal portions of all the major Virginia tributaries to the Bay. In addition to collecting water quality indicator data, volunteers also make wildlife observations. Data gathered by these volunteers is used in Virginia's biennial report to Congress on the status of water quality, and reported to the EPA's Bay Program Office.

*Alliance for the Chesapeake Bay, Virginia Citizen  
Monitoring Program/*

*Virginia Department of Environmental Science*

Contact: Joyce Brooks, ACB, 804.775.0951/

Rick Hoffman, DEQ, 804.698.4334

December 1990, November 1991,

December 1993, September 1995

1989 Task 4, 1990 Task 6, 1991 Task 6, 1994 Task 24



## Water Quality

### Groundwater Transport of Fecal Coliform Bacteria to Open Coastal Waters of Virginia's Coastal Plain: A GIS Approach

Fecal coliform data sets were analyzed using computerized spatial analysis (GIS) and statistical methods. Sixteen of Virginia's 21 coastal counties exhibited statistically significant increasing fecal coliform bacteria levels.

The data encompasses the time period between 1981 and 1992, and incorporates 2,614 sampling stations and some 191,910 individual measurements. While the primary focus of this study was to investigate the linkage between groundwater discharge and elevated fecal coliform levels in adjacent surface waters using a GIS approach, the available fecal coliform data set and collection methods were not designed for this detailed analysis. Using the best available data for Virginia's Eastern Shore, the significance of several groundwater parameters (hydraulic gradient, soil permeability, Darcy velocity) and urban nearshore land use suggest that on-site wastewater disposal may be related to elevated fecal coliform densities. This observation, however, should be treated with caution given the low overall significance of the regression. Visual observation of the data exhibited the general trend of increasing fecal coliform densities with distance upstream tidal creeks and inlets. The trend was consistent for all major tributaries and Virginia's Eastern Shore. A "land mass" factor provided the strongest correlation with water column fecal coliform levels as compared to other environmental and computer parameters. Low fecal coliform levels were correlated to winter sampling, sampling under the influence of low precipitation rates, high-tide conditions, and high salinity.

*Virginia Polytechnic Institute and State University*

*Contact: Daniel Gallagher, 540.231.5889*

*April 1994*

*1992 Task 11*



### Groundwater Transport of Fecal Coliform Bacteria and Nutrients from Residential On-Site Wastewater Disposal Systems to Virginia's Coastal Plain

This study was conducted to evaluate water quality impacts of groundwater discharge from residential land uses utilizing on-site wastewater disposal systems (OSWDS's) to coastal waters of Virginia. The objectives of this study were to: 1) to investigate the transport of fecal coliform bacteria from residential lands using OSWDS's to adjacent surface waters; 2) to provide data on nearshore sediment nutrient flux adjacent to residential land use utilizing OSWDS's; 3) to examine the prevalence of "false positives" in the standard gas production assays; and, 4) to assess the potential of a simplistic GIS approach to target high-risk shorelines that could benefit from OSWDS improvement or implementation of best management practices.

Shoreline groundwater inorganic nitrogen concentrations were approximately two orders of magnitude greater than adjacent surface waters, and inorganic phosphorus values were three-four fold or greater. Nearshore sediments adjacent to residential land uses represented an overall source of DIN and DIP to surface waters; mean DIN fluxes were comparable to those reported for agricultural lands. While OSWDS drainfield fecal coliform densities were generally two or three orders of magnitude greater than surface waters, shoreline groundwater fecal coliform bacteria densities were consistently low, and in most cases near the method detection limit. Sediment released greater densities of fecal coliform bacteria when subjected to stimulated ground-water flow than cores collected in regions not under the influence of OSWDS drainage. This result suggests that supplemental substance inputs, such as nutrients and organic carbon, may be responsible for elevated fecal coliform densities and greater survivability in nearshore sediments under the influence of OSWDS drainage.

*Virginia Polytechnic Institute and State University*

*Contact: William Reay, 804.642.7119*

*March 1995*

*1993 Task 20*



## Water Quality

### An Investigation of the Feasibility of Testing One or More Alternative On-Site Sewage Treatment Systems in the Richmond Region

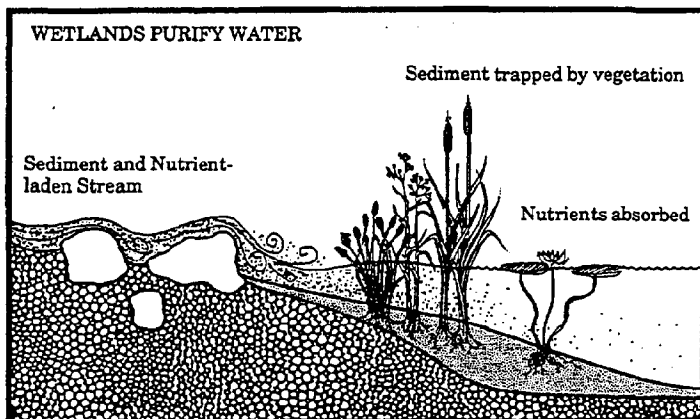
In Virginia, 650,000 year-round housing units use on-site sewage disposal systems, many of these in rural areas. A majority of these homes use conventional septic tank/drain field systems. There are, however, many potential building sites that are not suitable for these systems. The goal of this report was to investigate the reasons that cause conventional systems to fail. In addition, the report examines three alternatives to these systems: low pressure distribution systems, elevated sand mounds and constructed wetlands. Based on interviews with individuals from the Virginia Department of Health, Virginia Polytechnic Institute & State University and others, the need for more investigation of the potential for use of these systems was determined. Specifically, more information is needed about how these systems function in the various soil and water table conditions in the Virginia coastal plain. The report recommends a test methodology for these systems including costs and financing options.

*Richmond Road Planning District Commission*

*Contact: Larry McCarty, 804.358.3684*

*November 1993*

*1992 Task 34 (Coastal Technical Assistance Program)*



Wetlands help purify water by filtering out nutrients, wastes, and sediment from runoff and floods. (from VIMS Wetlands Program *Technical Report*, 1991 No. 91-A) See: Public Education, page: *Wetlands Newsletter & Technical Reports*

### Tyler's Beach Sanitation Unit

The Tyler's Beach Boat Harbor is situated on the western Shore of the lower James River in Isle of Wight County. This facility is used primarily by a group of commercial fisherman who work the lower James River. In 1996, the Virginia Marine Resources Commission reconstructed and added an extension to the pier. In order to bring the pier into compliance with the Virginia Department of Health's Regulations for Marinas and Boat Moorings. Isle of Wight was required to purchase a portable sanitation unit to be located at the site of the pier.

*Isle of Wight*

*Contact: Mary Ann Welton, 757.365.6316*

*December 1996*

*1995 Task 2.6*



### Laundromat Wastewater Treatment

This report reviews alternatives for treatment and disposal of wastewater from five Eastern Shore Virginia coin-operated laundromats. This project was a result of a VPDES permit compliance schedule from the Virginia State Water Control Board, which required four of the five laundromats to cease stream discharge by August 1992.

*Accomack-Norhampton*

*Planning District Commission*

*Contact: Jim McGowan, 757.787.2936*

*May 1992*

*1991 Task 38*



# Water Quality

## Suitability of Precision Farming Technology in Virginia's Coastal Zone

This purpose of this study was to evaluate the potential success of precision farming in the Coastal Zone of Virginia. Studies were performed at eleven sites within the Coastal Zone to quantify the spatial variability in soil chemical parameters; determine the optimum sampling strategies; evaluate impacts of precision farming on surface water quality; and compare economics of precision farming and conventional farming systems.

The soil chemical parameters (P, K, and pH) exhibited substantial spatial variability within each field as well as among various sites. In general, P values had the highest degrees of variabilities, compared to K and pH at each sites. Study results showed that the number of soil samples needed under precision farming depends on the confidence level and the expected deviations around the actual mean value of a soil parameter. More soil samples are required at higher confidence level and at smaller deviations around the actual mean values. Further, analysis indicated that the parameters with higher coefficient of variation (CV) were found to have smaller soil sampling intervals compared to those with lower Cvs. Due to practical and cost considerations, it may not always be possible to adopt different sampling intervals for different parameters. Therefore, for the region, a sampling interval of 328 ft. is suggested for adequate characterization of P, K, and pH levels.

The fertilizer rate required under precision farming would be approximately the same as under the uniform application system, but the fertilizer input distribution within a field would be different under the precision farming system. The spatially different distribution of fertilizer would prevent under- and over-application of fertilizer, and hence would improve fertilizer use efficiency. Results of AGNPS model, interfaced with the GIS, indicated a 12-25% reduction in N losses to surface water under precision farming, compared with the conventional farming system. However, further research needs to be conducted using continuous NPS model, which has crop growth and production components. Further study showed that precision farming produced higher net profits than the conventional farming system. The net profits under the precision farming increased with increased corn grain prices. Results also indicated that to demonstrate the profitability of precision farming, corn output analysis should be conducted along with fertilizers input analysis.

This study demonstrates the potential benefits of the precision farming over the conventional farming systems. The N losses in surface water could substantially be reduced if precision farming is implemented in the field. The benefits of precision farming could be achieved only when an improved fertilizer application technology capable of applying variable rate would become available to farmers. However, results indicate that precision farming technology has great potential for improving the environmental and economic benefits in the Coastal Plains of Virginia.

*Virginia Polytechnic Institute and State University*

*Contact: Saied Mostaghimi, 540.231.7605*

*February 1997*

*1995 Task 72*



*See Also:*

*Shoreline Management, page 82:*

*Hydrodynamics of Sediment Suspension in the Littoral Zone of the York River*



# Water Quality: Chesapeake Bay Preservation Act

## Polecat Creek Watershed Project

Polecat Creek, located in Caroline County, Virginia, is a small watershed in the Chesapeake Bay drainage. This site was selected for a ten-year water quality monitoring project, begun in 1991 by the Chesapeake Bay Local Assistance Department and the Council on the Environment (now the Department of Environment of Environmental Quality). At the start of this monitoring project, this watershed was predominately rural and undeveloped but likely to see a substantial increase in urban development during the ten year project period. About two-thirds of the watershed was designated as primary growth area in the County's Comprehensive Plan. In addition, a regional wastewater treatment plant was going on-line, and is currently servicing much of the area. In the last two years a number of development projects have been proposed, and three have begun production. The primary goal of the project is to describe the efficacy of emerging land use regulations and policies in protecting adjacent water quality from nonpoint source pollution during urban development activities.

The three components of the monitoring program include: 1) a system of water quality monitoring networks that provide quantitative information about chemical, physical, and biological parameters of surface and rain water. (temperature, pH, dissolved nitrogen, conductivity, nutrients, sediment, and bacteria. Biological communities are assessed using EPA's Rapid Bioassessment Protocol III (benthic macro invertebrate community structure) and an index of Biotic Integrity (fish community structure). 2) a database of land use activities and land cover characteristics in the watershed is maintained, and updated annually, and 3) a geographic information system (GIS) has been developed, and provides a link between the water quality data, the land use and land cover data and a digital geographic base map has been developed, which is being used to assess monitoring data sets, and will be used to develop a nonpoint source pollution model for the watershed. The GIS also provides a way to identify potential links between water quality trends and activities on adjacent land.

Thus far, the project has shown that the water quality of the streams in the watershed is generally high. As the watershed experiences development activity, the project will track any changes in water quality which will help to determine the effect of the Bay Act Program. The agency produces an annual newsletter to provide citizens in the Polecat Creek Watershed and the general public with updates on the progress of the project.

*Chesapeake Bay Local Assistance Department*

*Contact: C. Scott Crafton, 804.225.4330*

*December 1993 (Digital Color Ortho Photos); September 1994, September 1995, October 1996 (Biological Monitoring Report); September 1995, October 1996 (Chemical Monitoring Report); March 1995 (Completion of surface water monitoring network and installation of rain gages); October 1996 (Land Use/Land Cover Report)*  
*1991 Task 8; 1992 Task 5.2; 1993 Task 3; 1994 Task 10 & 82; 1995 Task 9, 14 & 82; 1996 Task 7*



# Water Quality: Chesapeake Bay Preservation Act

## Chesapeake Bay Preservation Area Maps

These maps provide a general description of the a locality's Chesapeake Bay Preservation Areas. They are consulted by regional resource managers and others prior to engaging in a regulated activity.

Resource Preservation Areas (RPAs) are areas that are close to the shoreline, help to protect water quality, and are easily damaged by the impact of development. RPAs include tidal wetlands, tidal shores, nontidal wetlands connected by surface flow, and an any adjacent 100-foot vegetated buffer area.

Resource Management Areas (RMAs) include additional floodplains, highly erodible soils, steep slopes, highly permeable soils, nontidal wetlands, and similarly sensitive lands not included in the RPA. Intensely Developed Areas (IDAs) are also indicated where appropriate.

*Chesterfield County*  
804.748.1035  
September 1990  
1989 Task 18.5



*Essex County*  
804.443.4331  
December 1990  
1989 Task 18.7



*The City of Fredericksburg*  
540.372.1179  
December 1990  
1989 Task 18.32



*Hanover County*  
804.537.6181  
October 1990  
1989 Task 18.10



*City of Hampton*  
804.727.6142  
November 1990  
1989 Task 18.9



*New Kent County*  
804.966.9690  
October 1990  
1989 Task 18.22



*Mathews & King and Queen County Preservation Maps can be obtained from the Middle Peninsula Planning District Commission, 804.758.2311*

*King and Queen County*  
December 1990  
1989 Task 18.17



*City of Newport News*  
757.247.8761  
September 1990  
1989 Task 18.23



*Northumberland County*  
804.580.8910  
September 1990  
1989 Task 18.2



*City of Poquoson*  
757.868.3535  
December 1990  
1989 Task 18.29



*City of Richmond*  
804.780.6313  
October 1990  
1989 Task 18.33



*Spotsylvania County*  
540.582.7172  
October 1990  
1989 Task 18.32b



*City of Virginia Beach*  
757.427.4621  
December 1990  
1989 Task 18.38



*Mathews County*  
December 1990  
1989 Task 18.20



# Water Quality: Chesapeake Bay Preservation Act

## Chesapeake Bay Preservation Area Programs

These documents provide information to the public on the City ordinance and zoning map amendments being considered to meet the requirements under the Chesapeake Bay Preservation Act and Regulations. Included in these reports are Chesapeake Bay Preservation Areas maps, summaries of the overlay district and regulations, and the revised city ordinances.

*Isle of Wight*  
757.357.3191 ext.316  
October 1990  
1989 Task 18.13

*City of Norfolk*  
757.441.2152  
September 1990  
1989 Task 18.24

In addition to presenting the model ordinance and justification materials, these documents elaborate on the implementation of several provisions of the Chesapeake Bay Preservation Act. They discuss the challenge presented in meeting the performance criteria of the Act and the solutions proposed in the model ordinance. These reports also briefly review other state and federal regulations that are similar to the Chesapeake Bay Regulations that potentially overlap.

This report outlines the environmental resources used to delineate the Chesapeake Bay Preservation Area in the James River watershed of Surry County. This environmental inventory is based upon existing maps and data relating to key environmental resources where alteration could impact the water quality of the Chesapeake Bay and its tributaries. A description of the sources of information used to map each resource is given.

*Northern Virginia  
Planning District Commission*  
703.642.0700  
October 1990  
1989 Task 18.26

*Surry County*  
757.294.5297  
February 1990  
1989 Task 18.37

The purpose of these projects was to develop the major ordinances necessary to implement Virginia's Chesapeake Bay Preservation Act. These implementing ordinances are designed to protect and improve the water quality of the Bay, its tributaries, buffer areas, and other sensitive environmental lands by minimizing the potential adverse effect of human activity. This project also details performance guidelines for use by the City in granting, denying or modifying requests to subdivide, use and develop land in the Chesapeake Bay Preservation Areas.

*Caroline County*  
804.633.4303  
December 1990  
1989 Task 18.2

*The City of Portsmouth*  
757.393.8836  
September 1990  
1989 Task 18.30

*Charles City County*  
804.829.9217  
November 1990  
1989 Task 18.3

*Stafford County*  
540.659.8668  
September 1990  
1989 Task 18.35

*The City of Chesapeake*  
757.547.6176  
October 1990  
1989 Task 18.4

*City of Williamsburg*  
757.220.6130  
December 1990  
1989 Task 18.40

# Water Quality: Chesapeake Bay Preservation Act

## Regulations

These regulations are intended to promote the proper use, management, and protection of the vast, sensitive and unique lands which contribute to the economy of Tidewater and especially the Chesapeake Bay. The effect of these provisions is not necessarily to deter development or the use of such areas, but rather to ensure that the type of development permitted by the district will be undertaken with a recognition of the particular environmental qualities and conditions of a proposed development site.

### *Gloucester County*

804.693.4040

October 1990

1989 Task 18.8



### *City of Hopewell*

804.541.2220

July 1990

1989 Task 18.12



### *Lancaster County*

804.462.5220

October 1990

1989 Task 18.19



### *City of Petersburg*

804.733.2308

September 1990

1989 Task 18.28



### *City of Suffolk*

757.925.6485

March 1991

1989 Task 18.36



### *York County*

757.890.3300

September 1990

1989 Task 18.41



## Chesapeake Bay Preservation Area Overlay Districts

### *Colonial Heights*

804.520.9275

September 1990

1989 Task 18.6



### *King William County*

804.769.4933

November 1990

1989 Task 18.18



### *James City*

757.253.6678

August 1990

1989 Task 18.14



### *City of Portsmouth*

757.393.8836

September 1990

1989 Task 18.30



### *King George County*

540.775.7111

October 1990

1989 Task 18.16



### *Richmond County*

804.333.3415

September 1990

1989 Task 18.34



### *Westmoreland County*

804.493.0120

September 1990

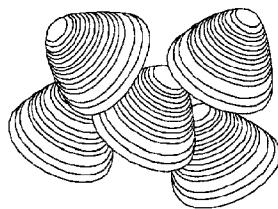
1989 Task 18.39



# Water Quality: Chesapeake Bay Preservation Act

## Comprehensive Town Plans and Zoning Ordinances on the Eastern Shore

The following Town Plans and Zoning Ordinances, necessary to implement Virginia's Chesapeake Bay Preservation Act, were developed and adopted by Eastern Shore Towns with assistance from the Accomack-Northampton Planning District Commission technical assistance program:



### Town Zoning Ordinances

*Town of Belle Haven*  
November 1992

*Town of Bloxom*  
December 1992

*Town of Nassawadox*  
May 1993

*Town of Hallwood*  
December 1993

*Town of Melfa*  
March 1994

*Town of Painter*  
June 1994

*Town of Cheriton*  
August 1994

*Town of Exmore*  
August 1994

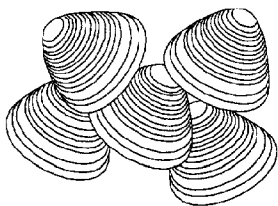
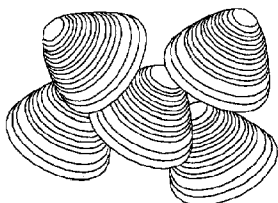
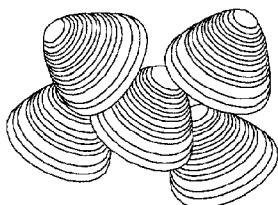
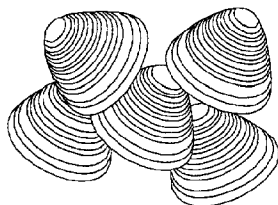
*Town of Eastville*  
March 1995

*Town of Parksley*  
April 1995

*Town of Nassawadox*  
(Amendment)  
January 1994

*Town of Cheriton*  
(Amendment)  
May 1995

*Town of Exmore*  
(Amendment)  
November 1995



### Comprehensive Town Plans

*Town of Cheriton*  
August 1991

*Town of Saxis*  
July 1992

*Town of Hallwood*  
November 1992

*Town of Parksley*  
November 1992

*Town of Onley*  
December 1992

*Town of Melfa*  
October 1992

*Town of Exmore*  
March 1993

*Town of Eastville*  
May 1994

*Cheriton Town Plan*  
(Amendment)  
August 1995

*Accomack-Northampton Planning*  
*District Commission*  
Contact: Paige Mayo, 757.787.2936  
1992 - 1994 Task 52, 1995 Task 51  
❖

See Also:  
Shoreline Management, page 61:  
Hampton Roads Regional Shoreline  
Element of Comprehensive Plans  
Public Education, page 49:  
A Guide to the Bay Act  
Coastal Technical Assistance, page 1:  
Local Environmental Planning  
Assistance Program

# Water Quality: Stormwater & Groundwater Management

## Stormwater Management Financing Strategy for Hampton Roads Virginia

This report discusses the variety of state and federal stormwater management programs that require local government implementation activities. Programs are described and financial needs of localities associated with the implementation are documented. Options for financing stormwater facilities are described and evaluated. A financing strategy, and a model stormwater utility ordinance for use by the region's local governments are recommended.

*Hampton Roads Planning District Commission*  
Contact: John Carlock, 804.420.8300

*January 1990*  
1989 Task 37

## Hampton Roads Planning District Regional Stormwater Management Program

The program, documented in a series of reports, encompasses the regional stormwater management technical assistance program of the HRPDC. Reports produced through this program include:

**Cooling Tower Discharge Policy and Guidance Manual** (November 1992).

**Institutional Process for Stormwater Management in Shared Watersheds - The Pagan River Watershed: A Pilot Study** (December 1992).

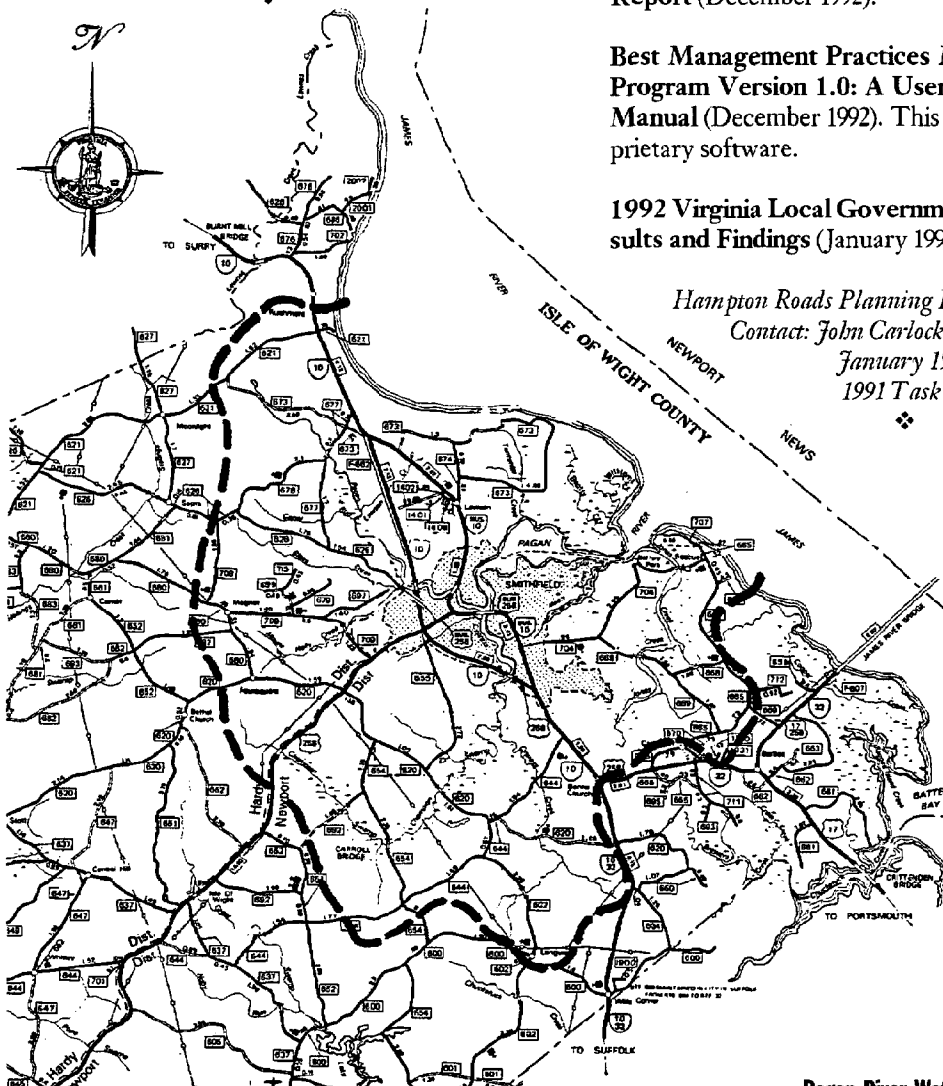
**Regional Stormwater Coordination Process: A Status Report** (December 1992).

**Best Management Practices Maintenance Tracking Program Version 1.0: A User's Guide and Software Manual** (December 1992). This report includes non-proprietary software.

**1992 Virginia Local Government Utility Survey: Results and Findings** (January 1993).

*Hampton Roads Planning District Commission*  
Contact: John Carlock, 757.420.8300

*January 1993*  
1991 Task 56



Pagan River Watershed

# **Water Quality: Stormwater & Groundwater Management**

## **Eastern Shore Groundwater Supply Protection and Management Plan**

This study summarized available information on water withdrawals, land use threats, and current control mechanisms on the Eastern Shore of Virginia. The report proposes recommendations to develop a comprehensive groundwater protection and supply management plan which will maintain an adequate supply of water and sustain high water quality for the future needs of the region.

*Accomack-Northampton Planning District Commission  
Contact: Jim McGowan, 804.787.2936  
November 1991  
1990 Task 58*



## **King George County Planning and Stormwater Management Study**

This planning study provides a set of tools for applying the principles specified in other regulatory and guidance manuals directly to stormwater management in King George County. The tools, including computer software and databases, provide a technically accurate and easily applied means for implementing relevant regulations, reviewing specific development alternatives, and exploring management questions.

*King George County  
Contact: 540.775.7111  
September 1991  
1990 Task 54*



## **Eastern Shore Model Comprehensive Plan Groundwater Amendment**

This plan provides a comprehensive and practical series of options, alternatives, and specific actions to promote compatibility between the Eastern Shore's water resources and the land use plans of Accomack County and Northampton County. The plan includes a detailed analysis of Eastern Shore groundwater resources and issues, and makes recommendations for the protection and management of the groundwater.

*Accomack-Northampton  
Planning District Commission  
Contact: Jim McGowan, 804.787.2936  
September 1992  
1991 Task 52*



## **Stafford County Groundwater Resource Protection Program**

This study investigated the impact of potential development on Stafford County's groundwater resources. Computer modeling techniques, field studies, the evaluation of safe yields, and the potential for artificial and natural recharge in selected aquifer systems are discussed in order to provide recommendations which can mitigate any future degradation.

*County of Stafford  
Contact: Bill Shelley, 540.659.8668  
December 1991  
1990 Task 63*





# Water Quality: Stormwater & Groundwater Management

## Stafford County Stormwater Ordinance

This ordinance establishes minimum stormwater management requirements for developments. It seeks to protect the safety and welfare of the county residents and businesses; reduce flood damage to property; minimize the impacts of increased stormwater runoff from new land development; and maintain the adequacy of existing and proposed culverts, bridges, dams, and other structures.

*County of Stafford*  
*Contact: 703.659.8668*  
*December 1993*  
*1991 Task 68*



## Stormwater/Erosion and Sediment Control Ordinances for Spotsylvania County

These ordinances are designed to protect and conserve steep slopes, public drinking water supplies, and flood plain areas. The report contains a draft amendment to the Erosion and Sediment Control Ordinances for steep slopes, steep slope maps, environmentally sensitive areas map, and digital map files for the Chancellorsville-Salem Church-Federicksburg Quad Study area.

*Spotsylvania County*  
*Contact: 703.582.7146*  
*March 1993*  
*1991 Task 67*



## Groundwater Protection Handbook for Southeastern Virginia

This report provides an overview of the groundwater hydrology in the Coastal Plain of Virginia, in particular southeastern Virginia. It describes groundwater use and threats in the region. Groundwater protection techniques for use by local governments are described. Model provisions for protection ordinances are included.

*Hampton Roads Planning District Commission*  
*Contact: John Carlock, 804.420.8300*  
*January 1990*  
*1988 Task 37*



## Hampton Roads Best Management Practices Design Guidance Manual

This manual presents a general planning methodology which was designed to facilitate local government compliance with the state and federal stormwater management requirements, in order to achieve an integrated system of stormwater detention basins. Potential strategies for the design, installation, and maintenance of stormwater facilities are examined. The impact of multiple designs on the cost and performance of stormwater management systems is investigated. Both water quality and quantity are considered. The strategies are applied to catchments constructed for average geomorphic parameters found in the Hampton Roads area.

*Hampton Roads Planning District Commission*  
*Contact: John Carlock, 804.420.8300*  
*December 1991*  
*1991 Task 37*



## York County Stormwater Management Plan

This engineering summary report provides information regarding the use of drainage basin computer models and stormwater improvement plans, which are useful to both planning and engineering staff, the development community, and the general public. The six drainage basins mentioned in the study are representative of the broad range of topographic conditions, conveyance system variations, land uses, and other variables which affect drainage basin hydrology and drainage system hydraulics found in York County.

*County of York*  
*Contact: Cindy Taylor, 804.890.3300*  
*September 1991*  
*1990 Task 70*





# Water Quality: Stormwater & Groundwater Management

## Gloucester Comprehensive Stormwater Management Program

Gloucester County is a rural area that has experienced accelerated population growth in the last decade. This project involved the development of a stormwater management plan for a 40-square-mile development zone, which incorporates water resource management into the county's land use, transportation and public facility practices. The county produced a **Program Development Manual for Comprehensive Stormwater Management**, which includes sections on land use and another on public facility planning. Methods of stormwater maintenance are discussed, including on-site retention, private maintenance associations, and the installation of a stormwater utility program. Gloucester County's choice to utilize a short-term stormwater ordinance is also discussed. Copies of the county's draft comprehensive plan amendment relative to land use, transportation, and stormwater management and a draft stormwater management ordinance are included.

*Gloucester County*  
*Contact: Jeff Haugbney, 804.693.4040*  
*March 1994*  
*1992 Task 54*



## City of Newport News Urban Filter Strip

The Urban Filter Strip project incorporated special design features and installation procedures to establish what is essentially a constructed forest-floor soil regime. The special soil mix and plantings work together to retain sediment and process pollutants after they drain off the parking lot, but before they reach the storm sewer system. This filter strip provides a low maintenance alternative to conventional stormwater pond, offers a permanent installation for confined sites where either construction or reconstruction of a pond is impractical, and has dual use as a visual barrier and landscape amenity. The city has begun to monitor the suspended solids, oils, metals, nitrogen and phosphorus levels. The monitoring will occur bi-monthly for a year.

*City of Newport News*  
*Contact: Kristine Hall, 757.247.7934*  
*September 1996*  
*1994 Task 74*



## Activated Carbon/Sand Filter Stormwater Pond Demonstration

Ultra-urban environments, typically highly developed, downtown areas, are a significant source of pollution, and present unique problems in nonpoint source pollution. They are characterized by highly impervious areas, high property values, and a lack of space on which to site conventional stormwater ponds. They are also a source of concentrated pollutants in runoff because of the degree of motor vehicle activity. The objective of this project was to design and implement an unconventional pond that would: 1) increase the removal of heavy metals, hydrocarbons, and other pollutants associated with ultra-urban runoff; 2) maintain recognized efficiency for removal of nutrients that contribute to the degradation of the Bay and coastal waters; 3) reduce maintenance time and costs through planned design; 4) provide a model that can be used in urban areas both regionally and nationally; and, 5) provide a pond that may serve as a site for future filtration testing.

This report investigates the effectiveness of a sand filtration design, which uses a layer of activated carbon to help remove heavy metals and hydrocarbons, over the course of 10 storm events. Results and conclusions of the effectiveness of this carbon/sand filter as a Best Management Practice for stormwater are discussed.

*City of Portsmouth*  
*Contact: Sid Kitterman, 804.393.8592*  
*December 1996*  
*1994 Task 72*



# Wetlands



# Wetlands

## Critical Elements in the Application of Water Quality Standards to Wetlands: Classification System, Beneficial Use Designation and the Identification of Exceptional Wetlands

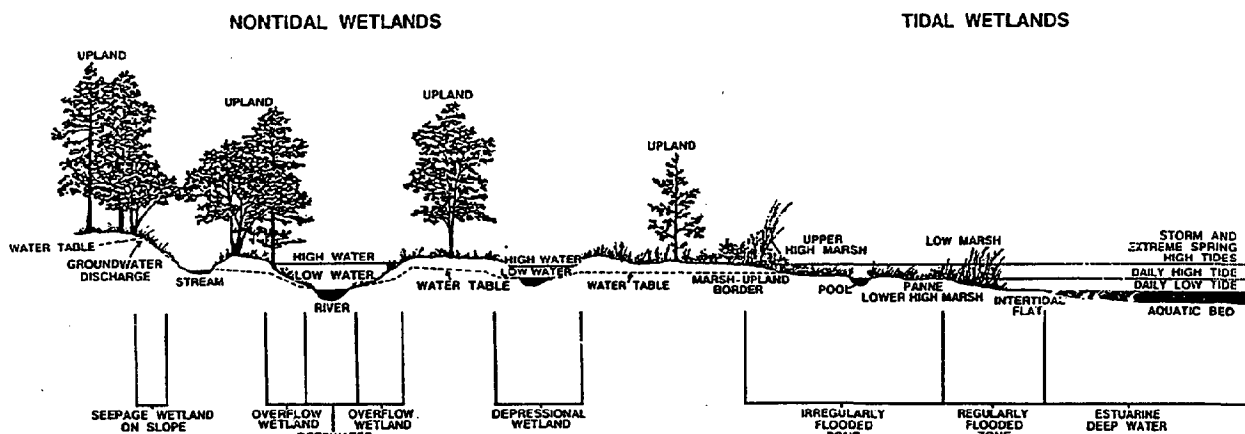
The development and implementation of water quality standards for wetlands is essential to ensuring the protection and enhancement of the Commonwealth's wetland resources. Water quality standards provide a link to other water quality management activities, including the following provisions of the federal Clean Water Act: permitting under Sections 402 and 404, control of nonpoint source pollution under Section 319, and water quality certification under Section 401, (requiring a certificate prior to any activity which may result in a discharge to state waters, also now called the Virginia Water Protection Permit).

Existing state wetlands management programs in Virginia include a tidal wetlands program at VMRC and a water quality permitting program at DEQ. The Commonwealth also conducts a tidal wetlands inventory program at VIMS, and has a cooperative wetlands mapping program with the National Wetlands Inventory Program. The five basic steps required in the process of applying state water quality standards regulations to wetlands include: inclusion of wetlands in the definition of "state waters;" designation of uses; adoption of aesthetic criteria and appropriate numeric criteria; adoption of narrative biological criteria; and the application of a state's antidegradation policy.

Currently, Virginia's comprehensive approach toward wetlands' water quality standards includes: wetlands classification; the development of functional assessment techniques; a functional analysis and vegetative characterization of Virginia's nontidal wetlands of the coastal zone; a review of current Virginia legislation, regulations and policy on wetlands and water quality standards; and a review of the application of water quality standards to wetlands in other states. This report discusses two possible approaches to wetlands classification and beneficial use designation: using existing water classification systems, or developing a system specifically for wetlands.

This report proposes a wetlands classification system which specifically addresses the diverse and complex nature of wetlands. It also discusses the incorporation of a wetlands classification scheme into Virginia Code in order to allow for the recognition of the various beneficial uses of different wetlands classes. This scheme includes Exceptional Wetlands, Riparian Wetlands (both Tidal and Nontidal), and Isolated Wetlands. Research continues to extend our current knowledge of wetland functions and the relationships between structure and function. As these studies become available, the proposed classification can be refined.

*Virginia Institute of Marine Science*  
 Contact: Carl Hersbner or Pam Mason, 804.642.7380  
 May 1995  
 1992 Task 91, 1993 Task 91



# Wetlands

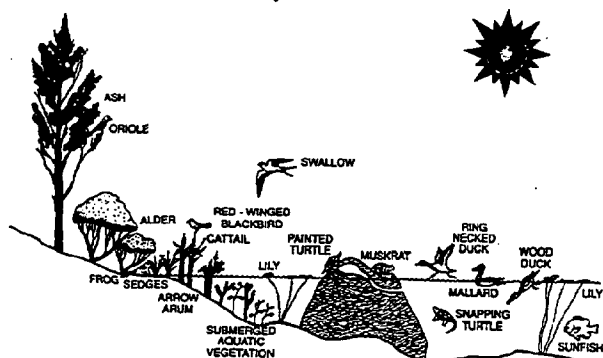
## Virginia Wetlands Management Handbook

The **Virginia Wetlands Management Handbook** is a comprehensive single reference resource to laws, guidelines and policies pertinent to wetlands and dune management in Virginia. The handbook is specifically designed for use by Virginia's wetlands managers, particularly local wetlands board members and their staff, representing the experience and technical knowledge accumulated by the Virginia Institute of Marine Science (VIMS) in its nearly 25 years of operation. Given the necessary turnover involved with a decentralized volunteer management system, it is important that a handbook be available. A three-ring binder format facilitates easy access and is designed for expansion as new documents become available. The first edition of the handbook was completed in December 1991.

In addition to updated listings of local government contacts, relevant laws, guidelines and policies, the second edition of the handbook contains guidance papers on compensatory mitigation and shoreline erosion. Other sections contain Attorney General's Opinions pertinent to wetlands and dune management in Virginia, wetland plant descriptions, a segment on marinas, and a description of the permit process in Virginia. The respective roles of the Virginia Marine Resources Commission and VIMS in wetlands management are discussed. New local wetlands board appointees will find this handbook particularly helpful as they become familiar with their roles as wetland and dune managers. The handbook also includes technical reports and advisories published and distributed by the VIMS Wetlands Program.

*Virginia Institute of Marine Science  
Contact: Tom Barnard, 804.642.7383*

*January 1996  
1990 Task 16, 1994 Task 16*



Nontidal wetland and adjacent aquatic habitat.  
(VIMS Wetlands Program Technical Report, 1991 No. 91-A)

## Wetlands Guidelines

Virginia's coastal zone is comprised of many different but highly interrelated ecological systems. Below the low tide lines are vast areas of submerged bottomland which are vitally important as fish and shellfish feeding, spawning and nursery habitat. These important ecological areas not only help support Virginia's highly valuable commercial fish catch, but also the myriad species which most Virginians rarely encounter.

Between the high-water line and the low-water line are the nonvegetated intertidal flats and beaches. These areas, though uncovered and seemingly devoid of life during a portion of each tidal cycle, provide important habitat for a host of different marine organisms, aquatic birds and mammals.

Various vegetated communities known as marshes are found above mean sea level. Best known for their high plant production on the order of tons per acre per year, marshes have other valuable functions. They are a buffer between the estuary and the upland; interacting with both.

The **Wetlands Guidelines Handbook** addresses marshes, beaches, tidal flats and subaqueous lands and their value. The handbook includes a brief description of each wetland community type and a section which ranks the community types relative to each other according to their environmental values. Although all wetland types are important, where management decisions must be made regarding necessary economic development affecting wetlands, this ranking system may help in guiding development into lesser value wetland communities. Also included are general and specific guidelines for wetlands-disturbing activities.

*Virginia Marine Resources Commission  
Contact: Tony Watkinson, 757.247.2255*

*reprinted September 1993  
1992 Task 9*



# Wetlands

## **Critical Natural Areas, Exemplary Wetlands, and Endangered Species Habitats in Southeastern Virginia**

The information presented in this report became part of a more comprehensive natural area study prepared for the entire Virginia portion of the Albemarle-Pamlico Estuarine Region (See *Habitat and Wildlife Management*, page 15). This report describes the findings of the 1991 natural heritage inventory of Southeastern Virginia. The inventory covers the counties of Prince George, Surry, and the cities of Chesapeake, Suffolk, and Virginia Beach. The goal of this inventory was to identify important rare plant and animal sites, as well as exemplary natural communities, with particular emphasis on wetland habitats.

*Virginia Department of Conservation and Recreation*  
*Contact: Chris Ludwig, 804.225.4855*  
*March 1992*  
*1990 Task 21*



## **Historical Losses of Wetlands Habitat in the Elizabeth River**

This project attempted to document and quantify the losses of tidal wetlands that have occurred in the Elizabeth River in the recent past. The areas indicated as wetlands in a series of USGS topographic maps from the early 1940's were digitized and compared with the VLMS Tidal Marsh Inventory series from the late 1970's using GIS. This comparison indicated that approximately half of the tidal wetlands in the Elizabeth River were lost during the study period. A series of color maps were produced for the river depicting the following information: the 1944 shoreline, the 1977 shoreline, the 1944 tidal wetlands and the 1977 tidal wetlands. The results of this study should help wetlands management efforts in the Elizabeth River by identifying the magnitude of the losses that have occurred and potential sites for wetlands restoration projects.

*Virginia Institute of Marine Science*  
*Contact: Walter Priest, 804.642.7385*  
*June 1996*  
*1994 Task 23*



## **An Assessment of Wildlife Utilization between a Man-made Marsh, an Adjacent Natural Marsh, and a Nearby Natural Marsh**

This study investigated the functions and values of man-made and natural tidal wetlands, and was among the first to use simultaneous sampling techniques to investigate animal use preferences between man-made and adjacent natural tidal wetlands.

This study determined that certain attributes of the man-made marsh resembled the natural marshes, such as temperature, dissolved oxygen, bird visitation, benthic macrofauna and fish diversity. However, data revealed some important differences between the man-made marsh and the natural marshes. The natural marshes were observed to function more effectively in a majority of the categories which are basic and primary structural components of the physical environment unique to tidal salt marshes. These include organic carbon content, salinity and vegetation. Other categories for which differences were observed included zooplankton abundance, marsh surface utilization, bird nesting sites, and use of the marshes by total fish, food fish and blue crabs. Some of these observed differences were seasonal.

The study discusses the many factors that need to be evaluated when the construction of a marsh is contemplated, including the question of whether a man-made marsh has the ability to mimic the functions and values of natural marshes. It goes on to suggest what should be included in a created wetland.

Recommendations for further research included: an expansion of the sampling procedures used in this study and the development of a formal method of comparison of mitigated natural areas with natural areas, an investigation of the importance of upland forest buffers, an investigation of the importance of these wetlands as nursery grounds for the blue crab, and further investigation of total dissolved organic matter versus utilizable dissolved organic matter in man-made and natural wetland systems.

*Virginia Institute of Marine Sciences*  
*Contact: Kirk Havens, 804.642.7386 or Carl Hershmer,*  
*804.642.7387*  
*November 1992*  
*1991 Task 9*



# Wetlands

## The Virginia Nontidal Wetlands Survey

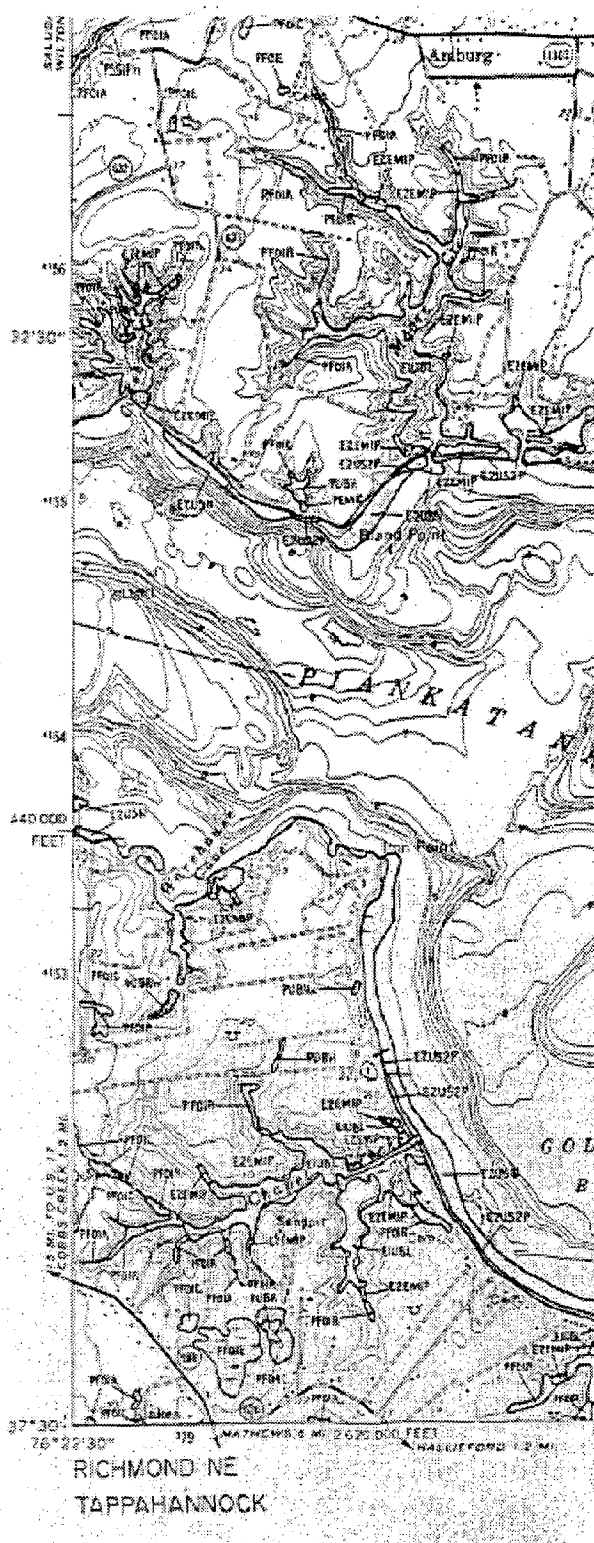
The Virginia Department of Conservation and Recreation (DCR) was assigned the responsibility of developing a nontidal wetland inventory by the 1989 Virginia General Assembly. An interagency committee, the Virginia Nontidal Wetlands Inventory Committee (VNWIC), was established to provide guidance for this effort and ensure the highest level of utility for users of the inventory. The National Wetland Inventory (NWI) program at the U.S. Fish & Wildlife Service (USFWS) is the single most extensive and comprehensive source of nontidal wetland information for Virginia. DCR summarized the aerial extent of wetlands and deepwater habitats found in the NWI database for this inventory. The state soil survey program was also determined to be the next single largest source of related wetland information. Data on the aerial extent and location of these soils were summarized and also included, for representative 2.5 minute quadrangles for the Richmond southeast and the Norfolk northeast areas.

*Virginia Department of Environmental Quality/  
Virginia Department of Conservation and Recreation  
Contact: Division of Soil and Water Conservation,  
804.762.4320  
March 1993  
1991 Task 13*

## Digitization of U.S. Fish & Wildlife National Wetlands Inventory Maps

The Commonwealth of Virginia received 139 new paper National Wetlands Inventory (NWI) maps from the U.S. Fish and Wildlife Service (USFWS) in 1993 (see 1991 Task 13 above). These maps were digitized and then converted by the DEQ's former EcoMAPS Program to an ARC/INFO GIS format for broader distribution.

*Virginia Department of Environmental Quality  
Contact: Virginia Coastal Program, Laura McKay,  
804.698.4323  
March 1994  
1992 Task 8*



## Wetlands

## Back Bay and Richmond County Marsh Inventories

This report includes two marsh inventories: one for Back Bay and its tributaries in Virginia Beach and one for Richmond County. These documents completed the initial round of inventories for all political jurisdictions with tidal wetlands. These inventories were published using ARC-Info software, which permits multiple uses of the data and supports future analysis of wetland status and trends in a manner not possible with the old format.

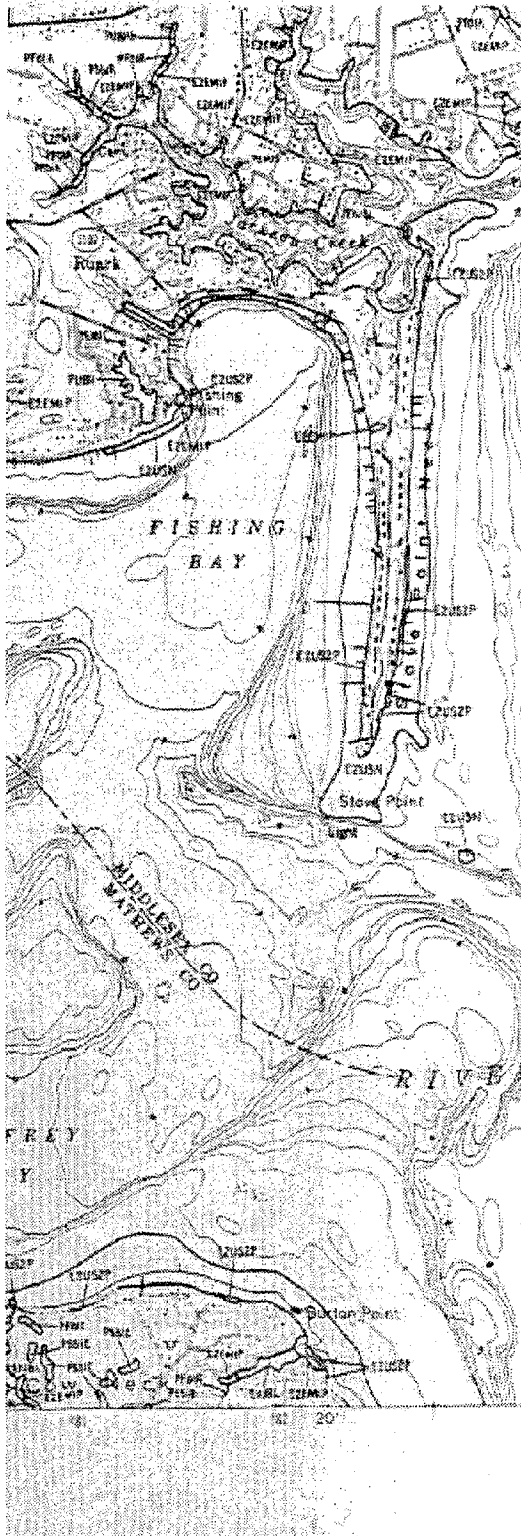
These inventories are part of a series of county and city tidal marsh inventories prepared by the Wetlands Advisory Group of the Institute of Marine Science. Please contact VLMS, or one of the numbers listed below, for a complete list of available inventories.

Virginia Institute of Marine Science  
Contact: Gene Silberborn, 804.642.7382 or Carl Hershner,  
804.642.7387  
November 1990  
1989 Task 8

## Newport News Wetlands Survey and Analysis

Nontidal wetlands were identified in three designated project locations using standard and infrared aerial photography and National Wetlands Inventory maps. The results and findings of the wetlands investigations include inventories, field notes, data sheets, and maps of potential nontidal wetland areas.

City of Newport News  
Contact: 804.247.8761  
December 1991  
1990 Task 56





# Wetlands

## Virginia Wetlands: A Planning & Regulatory Perspective

An increase in the awareness of wetland values, coupled with concerns over wetland losses, has led to stricter federal and state measures to protect wetlands and other environmentally sensitive areas from the effects of uncontrolled development. One purpose of this report is to discuss wetland definitions, functions, and wetland protection measures. Another is to examine what local governments can do to preserve these natural areas by integrating wetland protection into other planning activities.

*Richmond Regional Planning District Commission*

*Contact: Larry McCarty, 804.358.3684*

*January 1991*

*1990 Task 34*



## The Use of Aerial Photographs in Identifying Wetland Permit Violations

The use of aerial photographs and aerial surveillance are excellent methods for identification and inspection of apparent wetlands violations. Photographs taken at both low and high altitudes were compared to evaluate relative cost-effectiveness, utility, and replicability for use in other jurisdictions.

As part of its 1993 Technical Assistance grant, and as a result of its earlier grant project, NVPDC conducted low-level aerial photographs of the Prince William County shoreline to aid the county wetlands board in identifying wetlands permit violators. The use of an ultra-light aircraft allowed NVPDC staff to target areas for closer inspection.

*Northern Virginia Planning District Commission*

*Contact: David Bulova, 703.642.0700*

*September 1992, Fall 1994*

*1991 Task 65, 1993 Task 31*



## Surry County Wetlands Zoning Ordinance

Surry County adopted this wetlands zoning ordinance to prevent the destruction of wetlands, while accommodating necessary economic development in a manner consistent with wetlands preservation. Activities in the county which may effect wetlands must be reviewed and approved by the Surry County Wetlands Board, established through this grant.

*County of Surry*

*Contact: 804.294.5210*

*March 1992*

*1990 Task 65*



## A Regional Wetlands Policy Plan for the Crater Region

The purpose of this project was to present background information on the issues surrounding both tidal and non-tidal wetlands, as well as current discussion of the national perspective on "no-net loss" policy, and the effects of this policy on the Chesapeake Bay region. Present policy directions appropriate for consideration by the Crater Region's Tidewater communities are discussed.

*Crater Planning District Commission*

*Contact: Victor Liu, 804.861.1666*

*September 1991*

*1990 Task 35*



*See Also:*

*Public Education, page 72:*

*Constructed Wetlands Conference*

*Public Education, page 72:*

*Wetlands Newsletter and Technical Reports*

*Public Education, page 73:*

*Wetlands Education Curriculum*

*Public Education, page 73:*

*Coping with Wetlands Workshop Series*



## Appendix

### Virginia Coastal Resources Management Program 1992 - 1996 Project Lists

#### Key:

EM - Environmental Management  
HW - Habitat & Wildlife Management  
LA - Land Acquisition  
LGP - Local Government Planning  
PA - Public Access: Planning & Construction  
PE - Public Education  
SAMP - Special Area Management Plans  
SM - Shoreline Management  
CTA - Coastal Technical Assistance  
WQ - Water Quality  
WQ: CBPA - Water Quality: Chesapeake Bay Preservation Act  
WQ: SGM - Water Quality: Stormwater & Groundwater Management  
WT - Wetlands

✓ - Project in progress at time of publication or will be summarized in next catalogue

#### AGENCY ACRONYMS

A-N PDC - Accomack-Norhampton Planning District Commission  
CBLAD - Chesapeake Bay Local Assistance Department  
Crater PDC - Crater Planning District Commission  
DCR - Department of Conservation & Recreation  
DEQ - Department of Environmental Quality  
DGIF - Department of Game & Inland Fisheries  
HR PDC - Hampton Roads Planning District Commission  
MP PDC - Middle Peninsula Planning District Commission  
NN PDC - Northern Neck Planning District Commission  
NV PDC - Northern Virginia Planning District Commission  
RADCO - Rappahannock Area Development Commission  
VIMS - Virginia Institute of Marine Science

SPECIAL NOTE: All VIMS phone numbers have been converted to a new exchange - 684 (former exchange was 642.). Please use the new VIMS phone numbers given in the project lists. The old exchange is used in the body of the catalogue.

VIMS/CBNERRS - Chesapeake Bay National Estuarine Research Reserve System  
VMRC - Virginia Marine Resources Commission  
VPI&SU - Virginia Polytechnic & State University

**Virginia Coastal Resources Management Program**  
**1992 Project List**  
**Federal Coastal Zone Management Funds**  
7th Year Implementation

revised 12/31/97

Total Federal Award (306/306A/6217/309) \$2,323,000  
Total Match (306/306A/309/6217) \$2,121,830

**SECTION 306/306A PROJECTS: Total Federal Award \$1,910,000**

		State Tasks		
Summary Pg.	Title	Task	Grantee	Federal \$
	Coastal & Bay Program Coordination	1	DEQ Contact: Laura McKay	\$215,100 Phone: 804.698.4323
	Public Information/Education/Special Projects	2	DEQ Contact: Laura McKay	\$94,279 Phone: 804.698.4323
PE 66	Living Resources Workshop	2.1	DCR - Soil & Water Contact: Motra Croghan	\$26,740 Phone: 804.786.3958
	Citizen's Guide to the Bay Act (cancelled)	2.2	CBLAD Contact: Scott Kudlas	\$5,000 Phone: 804.225.3440
PE 71	Birds of the York River: Brochures for CBNERRS	2.3	VIMS Contact: Mo Lynch	\$9,247 Phone: 804.684.7135
HW 28	Bald Eagle Management Guide for Land Managers and	2.4	W & M Contact: Bryan Watts	\$15,062 Phone: 804.221.2247
PE 64	Natural Heritage Resources Fact Sheets	2.5	DCR - DNH Contact: Kevin Heffernan	\$11,400 Phone: 804.786.7951
	Albemarle Pamlico Estuarine Study - Report Printing	2.6	DCR - DNH Contact: Larry Smith	\$1,500 Phone: 804.786.7951
CTA 3	Environmental Impact Review/Federal Consistency Staff	3	DEQ Contact: Tom Felvey	\$64,943 Phone: 804.698.3416
CTA 3	Local Environmental Planning Assistance Staff	4	DEQ Contact: Laura McKay	\$55,417 Phone: 804.698.4323
	EcoMAPS Staff and Subcontracts	5	DEQ Contact: Laura McKay	\$78,000 Phone: 804.698.4323
EM 14	Historic Resource Inventory Program	5.1	DHR Contact: Robert Carter	\$3,000 Phone: 804.722.3428
CBPA 105	Digital Color Ortho Photos of Polecat Creek Drainage	5.2	CBLAD Contact: Scott Crafton	\$8,500 Phone: 804.225.3440
LGP 41	Digitizing Seaside Tax Parcel Maps	5.3	Accomack County Contact: Gary Oliveri	\$20,000 Phone: 804.787.5726
match only	Support for the Chesapeake Bay Commission	6	DEQ Contact: Laura McKay	\$0 Phone: 804.698.4323
EM 16	Mapping Distribution & Abundance of SAV in the	7	VIMS Contact: Bob Orth	\$25,000 Phone: 804.684.7332
WT 120	NWI Digitizing: Norfolk NE, Richmond NE, Richmond SE	8	DCR / DEQ Contact: Laura McKay	\$70,500 Phone: 804.698.4323
CTA 4, SM 79, EM 11, WT 117	Permit Compliance/ Inspection Staff and Permit Tracking	9	VMRC Contact: Tony Watkinson	\$101,852 Phone: 757.247.2255
WQ 101	Groundwater Transport of Fecal Coliform Bacteria	11	VPI&SU Contact: Dan Gallagher	\$15,000 Phone: 703.231.5889
PE 73	Education Units for Wetlands Boards- Phase II	12	VIMS Contact: Bill Roberts	\$42,866 Phone: 804.684.7380
PE 72	Tidal Wetlands Permit Advisory Support	13	VIMS Contact: Carl Hershner	\$18,000 Phone: 804.684.7387
HW 28	Eagle Habitat Delineation Model/Plans & Distribution Maps for Rappahannock/James	14	DGIF Contact: Bryan Watts	\$40,110 Phone: 757.221.2247
HW 27	Coastal Rare, Threatened & Endangered Bird Surveys, Spatial Analysis of Marsh Use	15	DGIF Contact: Bryan Watts	\$31,990 Phone: 757.221.2247
HW 22	Conservation Planning for Natural Area Protection: Albemarle Pamlico Estuarine Study Area	16	DCR	\$15,600
PA 51	Public Access Plan & Visual Resource Assessment North Landing River Watershed	17	DCR Contact: John Davy	\$17,850 Phone: 804.786.1119

SM 81	Wave Energy Regime Model/Maps for the Chesapeake Bay & Tidal Tributaries	18	DCR/ODU	\$32,780
			Contact: Lee Hill/David Basco	Phone: 804.786.7119/804.642.7121
EM 10	Bioaccumulation Initiative- Phase 3	19	DEQ/ODU	\$50,000
			Contact: David Grimes	Phone: 804.698.4203
PA 49	Kiptopeke Construction Project: Boardwalks/Signage/Hawk Observatory	21	DCR	\$85,000
			Contact: John Davy	Phone: 804.786.1119
LA 37	North Landing River Acquisition on Alton's Creek for Public Access, Virginia Beach	22	DCR	\$85,000
			Contact: Larry Smith	Phone: 804.371.6205
LA 37	Land Acquisition: New Point Comfort, Mathews County	23	DEQ/Nature Conservancy	\$85,000
			Contact: Linda Lundquist-Crowe	Phone: 804.295.6106
WQ 100	Pretreatment Methodology for Crab-Processing Wastewater for Nutrient Reduction - Phase I	24	VPI & SU	\$15,000
			Contact: Greg Boardman	Phone: 703.231.8020
SM 81	GPS Equipment Purchase for State Coastal Lands Survey- Phase I	25	VMRC	\$30,100
			Contact: Gerry Showalter	Phone: 757.247.2225
	Data Summary: Marine Mammals/Sea Turtles- Phase I	26	VIMS	\$10,000
			Contact: Jack Musick	Phone: 804.684.7317
PE 69	Brochure: Non-Structural Alternatives for Shoreline Stabilization	27	VMRC	\$15,000
			Contact: Scott Hardaway	Phone: 804.692.7277
<b>Subtotals</b>				<b>\$1,394,837</b>
72.96%		State Share as a % of \$1,910,000 (Total 306/306A Award)		

#### Local Tasks

##### Planning District Commission Tasks

	Title	Task	Grantee	Federal \$
CTA 5	Technical Assistance	31	NVPDC	\$20,000
Contact: David Bulova Phone: 804.642.0700				
CTA 5	Technical Assistance	32	RADCO	\$20,000
Contact: Sandra Rives Phone: 703.373.2890				
CTA 5	Technical Assistance	33	NNPDC	\$19,244
Contact: Stuart McKenzie Phone: 804.529.7400				
CTA 5, LGP 45	Technical Assistance	34	RRPDC	\$20,000
Contact: Larry McCarty Phone: 804.358.3684				
CTA 5	Technical Assistance	35	Crater PDC	\$20,000
Contact: Victor Liu Phone: 804.861.1666				
CTA 5	Technical Assistance	36	MPPDC	\$21,200
Contact: Jim Uzel Phone: 804.758.2311				
CTA 5	Technical Assistance	37	HRPDC	\$40,000
Contact: John Carlock Phone: 757.420.8300				
CTA 5	Technical Assistance	38	A-NPDC	\$20,000
Contact: Jim McGowan Phone: 757.787.2936				
<b>Subtotals</b>				<b>\$180,444</b>

#### Local Competitive Tasks

	Title	Task	Grantee	Federal \$
SGM 111	Eastern Shore Groundwater Ordinance	51	Accomack-Norhampton PDC	\$20,000
Contact: Jim McGowan Phone: 757.787.2936				
PA 50	Walkway Construction on Jetty	52	Cape Charles	\$22,752
Contact: Jeannie Lewis Phone: 804.696.4333				
CTA 6	Wetlands Engineer for Enforcement	53	Essex, Kg. & Qn., Kg Wm.	\$24,255
Contact: Brian Wagner Phone: 804.443.4331				
SGM 113	Stormwater Management Program & Ordinance	54	Gloucester	\$40,000
Contact: Jeff Haughney Phone: 804.693.4040				
SM 83	Shoreline Element of 14 Local Government Comprehensive Plans	55	Hampton Roads PDC	\$45,320
Contact: Jeryl Rose Phillips Phone: 757.420.8300				
PA 55	Jones Creek Boat Ramp	56	Isle of Wight	\$60,000
Contact: Alan Nogiec Phone: 757.357.2217				
PA 58	Dragon Run Public Access Plan	58	Middle Peninsula PDC	\$15,500
Contact: Jim Uzel Phone: 804.758.2311				

	Floodplain Evaluation Program	59	Northern Neck PDC	\$10,892
			Contact: Stuart McKenzie	Phone: 804.529.7400
	Stormwater Flood Management Plan & Ordinance, Hazel Run	61	Spotsylvania	\$30,000
			Contact: Jim Dossett	Phone: 703.582.7028
HW 21	Natural Heritage Inventory - Phase IV	62	Virginia Beach	\$36,000
			Contact: Clay Bernick	Phone: 757.427.4621
	Stormwater Drainage Management Plan	63	West Point	\$30,000
			Contact: Watson Allen	Phone: 804.843.3330
			<b>Subtotals</b>	<b>\$334,719</b>
		27.04%	Local Share as a % of \$1,910,000 (Total 306/306A Award)	

SECTION 6217 Projects: Total Federal Award \$100,000				
	Title	Task	Grantee	Federal \$
WQ 97	Development of Coastal Nonpoint Pollution Control Program	81	DCR	\$100,000
			Contact: Rick Hill	Phone: 804.786.7119

SECTION 309 PROJECTS: Total Federal Award \$313,000				
	Title	Task	Grantee	Federal \$
WT 117	Nontidal Wetlands Classification System; ID Criteria; Designation of Beneficial Uses	91	VIMS	\$50,000
			Contact: Carl Hershner	Phone: 804.684.7387
SAMP 87	Project Coordinator and Sustainable Economic Development Strategy	92.1	Northampton County	\$79,000
			Contact: Tim Hayes	Phone: 757.331.1998
	Database and Mapping to Support Northampton Co. Special Area Mgmt. Plan	92.2	DEQ - EcoMaps	\$25,000
			Contact: Tim Hayes	Phone: 757.331.1998
SAMP 89	Migratory Bird Habitat Utilization Study	92.4	DCR/DGIF	\$60,000
			Contact: Tom Smith, DCR	Phone: 804.786.7951
			Ray Fernald, DGIF	804.367.8364
SAMP 90	Marsh Nest Survey Using Hand-held GPS	92.5	Nature Conservancy	\$14,000
			Contact: Barry Truitt	Phone: 804.442.3049
SAMP 92	Conservation Easement Development for High Priority Seaside Land Tracts	93	Nature Conservancy	\$85,000
			Contact: Greg Low	Phone: 703.860.5388
			<b>GRAND TOTAL</b>	<b>\$2,323,000</b>
			(306/306A/6217/309)	

**Virginia Coastal Resources Management Program**  
**1993 Project List**  
**Federal Coastal Zone Management Funds**  
**8th Year Implementation**

revised 12/31/97



Project in progress at time of publication and/or  
will be summarized in next catalogue

**Total Federal Award (306/306A/6217/309)**

**\$2,306,056**

**Total Match (306/306A/308/6217)**

**\$2,263,902**

**SECTION 306/306A PROJECTS: Total Federal Award \$1,964,000**

		State Tasks		
Summary Pg.	Title	Task	Grantee	Federal \$
	Coastal & Bay Program Coordination	1	DEQ	\$186,222
			Contact: Laura McKay	Phone: 804.698.4323
	Public Information/Education/Special Projects	2	DEQ	\$10,768
			Contact: Laura McKay	Phone: 804.698.4323
	Environmental Education	2.1	DEQ	\$28,519
			Contact: Ann Regn	Phone: 804.698.4442
	Public Information	2.2	DEQ	\$24,119
			Contact: Bill Hayden	Phone: 804.698.4447
PE 64	Chesapeake Youth Conservation Corps Environmental Projects	2.3	DEQ	\$10,000
			Contact: Bill Cuthriell	Phone: 757.382.8184
PE 76	Virginia Beach Agricultural Reserve Program: Public Opinion Survey	2.4	TNC	\$12,687
			Contact: Michael Lipford	Phone: 804.295.6101
PE 72	Oyster Reef Restoration Symposium Flyer	2.5	VIMS	\$4,300
			Contact: Mark Luckenbach	Phone: 804.787.5816
PE 67	Brochures: Fiddler Crab in Marsh/Oyster Reef Ecology	2.6	VIMS-NEERIS	\$9,000
			Contact: Mo Lynch	Phone: 804.684.7135
PE 65	Tidewater Low Country Almanac for the Middle Peninsula	2.7	Tidewater SWCD	\$20,280
			Contact: Burton Bland	Phone: 804.693.3562
CTA 3	EIR/Federal Consistency Staff Support	3	DEQ	\$116,800
			Contact: Tom Felvey	Phone: 804.698.3416
CTA 3	Local Environmental Planning Assistance Staff	4	DEQ	\$15,581
			Contact: Laura McKay	Phone: 804.698.4323
	EcoMAPS Staff and Subcontracts	5	DEQ	\$25,905
			Contact: Laura McKay	Phone: 804.698.4323
match only	Support for Chesapeake Bay Commission	6	DEQ/CB Commission	\$0
			Contact: Laura McKay	Phone: 804.698.4323
LA 38	Northwest River Marshes Acquisition, City of Chesapeake	7.1	DCR- Heritage	\$183,000
			Contact: Larry Smith	Phone: 804.371.6205
PA 56	Powhatan Creek Canoe Launch for Public Access	7.2	James City County	\$29,934
			Contact: Marvin Sowers	Phone: 757.253.6685
CBPA 105	Polecat Creek Water Quality Monitoring Program Startup	9	CBLAD	\$73,682
			Contact: Scott Crafton	Phone: 804.225.3440
HW 23	Natural Area Mgmt. Team & Model Plans	10	DCR-Heritage	\$47,490
			Contact: Sandra Erdle	Phone: 804.786.7951
EM 15	Submerged Historic Resources Assessment	11	DHR	\$26,162
			Contact: Catherine Slusser	Phone: 804.786.3143
EM 16	Mapping Distribution & Abundance of SAV in the Chesapeake Bay & Tributaries	12	VIMS	\$25,000
			Contact: Robert Orth	Phone: 804.684.7332
WQ 98	Water Quality Model for Small Coastal Basins	13	VIMS/DEQ-Water	\$35,880
			Contact: Albert Kuo	Phone: 804.684.7212
HW 31	Conservation Plan- Marine Mammals & Turtles	14a	VIMS	\$37,609
			Contact: Jack Musick	Phone: 804.684.7317
HW 31	Conservation Plan- Marine Mammals & Turtles	14b	DGIF	\$16,000
			Contact: Ray Fernald	Phone: 804.367.8364
SM 79	Eastern Shore Dredging Plan	15	VIMS/VMRC	\$66,675
			Contact: Tony Watkinson	Phone: 757.247.2255
HW 24	Intertidal Oyster Reefs: Settlement & Survival	16	VIMS/VMRC	\$40,800
			Contact: Roger Mann	Phone: 804.684.7360

CTA 4	Permit Compliance/ Inspection Staff and Permit Tracking System	17	VMRC	\$110,000
			Contact: Tony Watkinson	Phone: 757.247.2255
SM 81	Global Positioning System	18	VMRC	\$36,000
			Contact: Gerry Showalter	Phone: 757.247.2225
WQ 99	Modelling Cumulative Impacts/Carrying Capacity Small Creeks	19	VMRC	\$30,600
			Contact: Tony Watkinson	Phone: 757.247.2255
WQ 102	Groundwater Transport of Fecal Coliform Bacteria	20	VPI&SU	\$26,500
			Contact: William Reay	Phone: 804.642.7119
WQ 99	Nutrient Reduction Methodology for Crab Processing Plants	21	VPI&SU	\$15,000
			Contact: Greg Boardman	Phone: 703.231.6020
PE 69	E&S Control Pocket Field Manual & Autocad Drawings	22	DCR- Soil & Water	\$17,372
			Contact: Jimmy Edmonds	Phone: 804.786.3997
EM 12.13	Plant & Animal Resource Maps for Land Planning- Phase I	23	DCR- Heritage	\$6,555
			Contact: Steve Carter Lovejoy	Phone: 804.786.7485
PE 72	Tidal Wetlands Permit Advisory Support	24	VIMS	\$24,100
			Contact: Carl Hershner	Phone: 804.684.7387
WQ 99	Lynnhaven Tidal Prism Water Quality Model	25	VIMS	\$15,045
			Contact: Al Kuo	Phone: 804.642.7212
HW 25	Hard Clam Stock Assessment	26	VIMS	\$15,566
			Contact: James Wesson	Phone: 804.247.2121
✓	Multimedia Floodplain BMP Education Program	27	DCR- Floodplain	\$20,500
			Contact: Paul Peckens	Phone: 804.371.6095
HW 26	Conservation Plan for Birds in Barrier/Lagoon System	28	DCR/TNC	\$6,720
			Contact: Kennedy Clark/Barry Truitt	Phone: 804.786.7951/804.442.3049

**Subtotals** **\$1,370,371**

69.77% State Share as a % of \$1,964,000 (Total 306/306A Award)

#### Local Tasks/Planning District Commission Tasks

Title	Task	Grantee	Federal \$
CTA 5, Technical Assistance	31	NVPDC	\$20,000
WT 121, LGP 43		Contact: David Bulova	Phone: 703.642.0700
CTA 5 Technical Assistance	32	RADCO	\$20,000
		Contact: Sandra Rives	Phone: 703.373.2890
CTA 5 Technical Assistance	33	NNPDC	\$20,000
		Contact: Stuart McKenzie	Phone: 804.529.7400
CTA 5 Technical Assistance	34	RRPDC	\$20,000
		Contact: Larry McCarty	Phone: 804.358.3684
CTA 5 Technical Assistance	35	Crater PDC	\$20,000
		Contact: Victor Liu	Phone: 804.861.1666
CTA 5 Technical Assistance	36	MPPDC	\$23,501
		Contact: Jim Uzel	Phone: 804.758.2311
CTA 5 Technical Assistance	37	HRPDC	\$40,000
		Contact: John Carlock	Phone: 757.420.8300
CTA 5 Technical Assistance	38	A-NPDC	\$20,000
		Contact: Jim McGowan	Phone: 757.787.2936
	<b>Subtotals</b>		<b>\$183,501</b>

#### Local/Competitive Tasks

Title	Task	Grantee	Federal \$
CBPA 108 Bay Act Ordinances for Eastern Shore Towns	52	A-NPDC	\$30,000
		Contact: Jim McGowan	Phone: 757.787.2936
PA 50 Jetty Pier Phase II- Enhancements	53	Cape Charles	\$16,400
		Contact: Jeannie Lewis	Phone: 804.698.4333
TA 6 Wetlands Engineer - Year II	54	Essex/Kg & Qn/Kg. Wm.	\$26,225
		Contact: Gary Allen	Phone: 804.443.4331
LGP 42 Creative Rural Development Ordinances	55	Gloucester County	\$40,000
		Contact: Jeff Haughney	Phone: 804.693.4040
SAMP 93 Southern Watershed Management Plan	56	HRPDC	\$25,500
		Contact: John Carlock	Phone: 757.420.8300
Land-Use Ordinance Revisions	57	King William County	\$20,000
		Contact: Dennis Carney	Phone: 804.769.4933



CTA 6	Wetlands Enforcement Specialist	58	Middlesex County	\$18,500
			Contact: Charles Culley	Phone: 804.758.4330
SAMP 94	Dragon Run/Piankatank Watershed Mgmt.	59	MPPDC	\$32,500
			Contact: Jim Uzel	Phone: 804.758.2311
PA 54	Riverview Farm Park Boardwalk	60	Newport News	\$18,000
			Contact: Michael Poplawski	Phone: 757.926.8451
CTA 6	Wetlands Engineer	61	NNPDC	\$41,603
			Contact: Josie Wold	Phone: 804.529.7400
PA 53	Elizabeth River Interpretative Path/Canoe Trail	65	Virginia Beach	\$15,000
			Contact: Clay Bernick	Phone: 757.427.4621
PA 51	Harbor Enforcements: Boat Ramp/Parking/Signage	66	Wachapreague	\$70,400
			Contact: F.L. Wallace	Phone: 757.787.8669
PA 55	Shoreline Access Plan	67	Portsmouth	\$20,000
			Contact: Jocelyn Terry Adumuah	Phone: 757.393.8836
PA 58	River Walk Access & Ramp Plan	68	Ocoquan	\$16,000
			Contact: James Barnes	Phone: 703.330.8300
SM 83	Shoreline Protection Report	69	Stafford County	\$20,000
			Contact: William Shelley	Phone: 703.659.8669
<b>Subtotals</b>				<b>\$410,128</b>
30.23% Local Share as a % of \$1,964,000 (Total 306/306A Award)				

SECTION 6217 PROJECTS: Total Federal Award \$100,000				
	Title	Task	Grantee	Federal \$
WQ 97	Coastal NPS Pollution Mgmt. Program	81	DCR- Soil & Water	\$100,000
			Contact: Rick Hill	Phone: 804.786.7119

SECTION 309 PROJECTS: Total Federal Award \$228,000				
	Title	Task	Grantee	Federal \$
WT 117	Nonlidal Wetlands Classification System & Regulatory Package	91	VIMS/DEQ- Water	\$50,000
			Contact: Carl Hershner	Phone: 804.684.7387
SAMP 87	Northampton Special Area Mgmt. Plan	92	DEQ/Subcontracts	\$178,000
			Contact: Tim Hayes	Phone: 757.331.1998
SAMP 87	SAMP Coordination	92.1	Northampton County	\$71,005
			Contact: Tim Hayes	Phone: 757.331.1998
SAMP 87	Database and Mapping	92.2a	Northampton County	\$9,000
			Contact: Tim Hayes	Phone: 757.331.1998
SAMP 87	Database and Mapping	92.2b	University of Virginia	\$6,000
			Contact: Tim Hayes	Phone: 757.331.1998
SAMP 87	Economic Data and Strategy	92.3	Subcontract	\$52,930
			Contact: Tim Hayes	Phone: 757.331.1998
SAMP 90	Bird Habitat Policy	92.4a	DCR	\$13,690
			Contact: Tom Smith	Phone: 804.786.7951
SAMP 90	Bird Habitat Data	92.4b	DGIF	\$25,375
			Contact: Ray Fernald	Phone: 804.367.8364

SECTION 310 PROJECTS: Total Federal Award \$14,056				
	Title	Task	Grantee	Federal \$
	Oyster Disease Monitoring Equipment	40	VIMS	14,056
			Contact: Roger Mann	Phone: 804.684.7360
<b>GRAND TOTAL</b>				<b>\$2,306,056</b>
(306/306A/6217/309/310)				

**Virginia Coastal Resources Management Program**  
**1994 Project List**  
**Federal Coastal Zone Management Funds**  
**9th Year Implementation**

revised 12/31/97

☒ Project in progress at time of publication and/or  
will be summarized in next catalogue

Total Federal Award (306/306A/6217/309/308) \$2,658,000  
Total Match (306/306A/308/6217) \$2,483,880

**SECTION 306/306A PROJECTS: Total Federal Award \$2,117,000**

		State Tasks		
Summary Pg.	Title	Task	Grantee	Federal \$
	Coastal & Bay Program Coordination	1	DEQ Contact: Laura McKay	\$192,963 Phone: 804.698.4323
	Public Info/Education/Special Projects	2	DEQ Contact: Laura McKay	\$1,648 Phone: 804.698.4323
	Environmental Education	2.1	DEQ Contact: Ann Regn	\$19,683 Phone: 804.698.4442
	Public Information	2.2	DEQ Contact: Bill Hayden	\$15,770 Phone: 804.698.4447
EM 14	GIS Database of Underwater Archaeological Resources	2.3	VIMS Contact: Marcia Berman	\$9,895 Phone: 804.684.7188
	Updated Publication on Shoreline Mgmt in the Bay w/	2.4	VIMS Contact: Scott Hardaway	\$15,872 Phone: 804.684.7277
SAMP 91	Eco-Industrial Park Design Charette	2.5	Northampton County Contact: Tim Hayes	\$10,000 Phone: 757.331.1998
PA 50	Native Species Planting	2.6	Cape Charles Contact: Jeannie Lewis	\$10,000 Phone: 804.698.4333
SAMP 90	1995 Eastern Shore Birding Festival	2.7	Northampton County Contact: Laura McKay	\$9,000 Phone: 804.698.4323
PE 64	Chesapeake Bay Youth Conservation Corps Environmental	2.8	Youth Conservation Corps Contact: Bill Cuthrell	\$7,219 Phone: 757.382.8184
SAMP 91	Public Information for SAMP & Eco-Industrial Park	2.9	Northampton County Contact: Tim Hayes	\$46,600 Phone: 757.331.1998
HW 29	Avian Migration at Kiptopeke State Park	2.10	Northampton County Contact: Bill Williams (KESTREL)	\$7,561 Phone: 804.253.6779
PE 74	EcoTour Guide Certification Curriculum	2.11	DCR Contact: Laura McKay	\$10,270 Phone: 804.698.4323
HW 32	Distribution of Bottlenose Dolphins in Tidal Rivers	2.12	Virginia Marine Science Museum	\$4,800
PE 65	Tidewater Low County Almanac for the Northern Neck	2.13	Contact: Mark Swingle NNPDC	Phone: 757.437.4949 \$21,000
PE 69	Virginia Erosion & Sediment Control Pocket Field Manual	2.14	Contact: Vonnie Reynolds DCR	Phone: 804.529.7400 \$2,483
CTA 3	EIR/Federal Consistency	3	Contact: Jimmy Edmonds DEQ	Phone: 804.786.3997 \$145,763
match only	Support for Chesapeake Bay Commission	6	Contact: Tom Felvey DEQ	Phone: 804.698.3416 \$0
LA 38	Northwest River Timber Rights Acquisition, City of Chesapeake	7.1	Contact: Laura McKay DCR	Phone: 804.698.4323 \$178,575
CTA 3, PE 68	Bay Act Local Assistance Planners/Bay Act Guide	9	Contact: Larry Smith CBLAD	Phone: 804.371.6205 \$52,059
CBPA 105	Biological Monitoring of Polecat Creek	10	Contact: Scott Kudlas CBLAD	Phone: 804.225.3441 \$16,934
EM 12,13	Plant & Animal Resource Maps for Land Planning	11	Contact: Scott Crafton DCR/DGIF	Phone: 804.225.3440 \$34,110
	Coastal Hazards Chapter Floodplain Mgmt.	12	Contact: Steven Carter Lovejoy, DCR/Becky Wajda, DGIF DCR	Phone: 804.371.6095 \$15,050
	Beach Parameter Design -Bay Shorelines	13	Contact: Paul Peckens DCR	Phone: 804.371.6095 \$34,325
EM 14	Submerged Historic Resources- Phase II	14	Contact: Carlton Lee Hill DHR	Phone: 804.786.3998 \$6,112



EM 16	Mapping Distribution & Abundance of SAV in the CB & Tributaries	15	Contact: Catherine Slusser VIMS	Phone: 804.786.3143 \$25,000
WT 118	Update of Local Wetlands Board Handbook	16	Contact: Robert Orth VIMS	Phone: 804.684.7332 \$19,036
PE 73	Wetlands Mgmt Training Project- Phase III	17	Contact: Tom Barnard VIMS	Phone: 804.684.7383 \$39,174
SM 79	Littoral Sediment Suspensions in York River	18	Contact: Bill Roberts VIMS	Phone: 804.684.7380 \$43,644
WQ 99	Water Quality Model Small Coastal Basins- Phase II	19	Contact: John Boon VIMS/DEQ	Phone: 804.684.7272 \$38,683
SM 78	Eastern Shore Dredging Plan- Phase II	20	Contact: Al Kuo VIMS/VMRC	Phone: 804.642.7212 \$75,405
HW 24	Intertidal Oyster Reefs: Settlement & Survival	21	Contact: Walter Priest/Chris Frye VIMS/VMRC	Phone: 804.684.7385/757.247.2200 \$48,368
CTA 4	Permit Compliance/ Inspection Staff and Permit Tracking System	22	Contact: Roger Mann VMRC	Phone: 804.684.7360 \$123,531
WT 119	Historical Wetlands Losses- Elizabeth River	23	Contact: Tony Watkinson VIMS	Phone: 757.247.2255 \$24,710
WQ 101	Citizen Monitoring	24	Contact: Walter Priest DEQ/ACB	Phone: 804.642.7385 \$18,750
✓	Reduction of Marine Mammal Bycatch	25	Contact: Rick Hoffman VMRC	Phone: 804.698.4334 \$24,000
HW 33	Marine Mammal Stranding Network	26	Contact: David Bower VIMS	Phone: 804.247.2061 \$14,900
EM 18	Draft Watershed Action Plan	27	Contact: Jack Musick Elizabeth River Project	Phone: 804.684.7029 \$9,939
PA 52	Alton's Creek: Recycled Lumber Boardwalk & Canoe Launch	28	Contact: Marjorie Mayfield DCR	Phone: 804.625.3648 \$44,577
	Reforestation of Riparian Buffers: Demo Plantings	29	Contact: Larry Smith DEQ	Phone: 804.371.6205 \$27,270
			Contact: William Reay	Phone: 804.642.7119

**Subtotals** **\$1,444,699**

68.24% State Share as a % of \$2,117,000 (Total 306/306A Award)

#### Local Tasks

#### Planning District Commission Tasks

Title	Task	Grantee	Federal \$
CTA 5	Technical Assistance	31 NVPDC	\$20,000
CTA 5	Technical Assistance	Contact: David Bulova 32 RADCO	Phone: 757.642.0700 \$20,000
CTA 5	Technical Assistance	Contact: Sandra Rives 33 NNPD	Phone: 703.373.2890 \$17,597
CTA 5	Technical Assistance	Contact: Stuart McKenzie 34 RRPDC	Phone: 804.529.7400 \$20,000
CTA 5	Technical Assistance	Contact: Larry McCarty 35 Crater PDC	Phone: 804.358.3684 \$20,000
CTA 5	Technical Assistance	Contact: Victor Liu 36 MPPDC	Phone: 804.861.1666 \$27,500
CTA 5	Technical Assistance	Contact: Jim Uzel 37 HRPDC	Phone: 804.758.2311 \$40,000
CTA 5	Technical Assistance	Contact: John Carlock 38 A-NPDC	Phone: 757.420.8300 \$23,542
		Contact: Jim McGowan	Phone: 757.787.2936

**Subtotals** **\$188,639**

#### Local Competitive Tasks

Title	Task	Grantee	Federal \$
	Digital Maps of Ground Water & Pollution Sources	51 CBLAD / Accomack County	\$15,000
CBPA 108	Bay Act Ordinances for Eastern Shore Towns	Contact: 52 CBLAD / A-NPDC	Phone: 804. \$26,429
PA 57	Scenic Overlook and Nature Trail at Lewis Park	Contact: Jim McGowan 53 Charles City County	Phone: 757.787.2936 \$34,423
	Tax Map Digitization for Environmental Mgmt	Contact: John Bragg 54 CBLAD / Gloucester County	Phone: 804.829.9217 \$42,000

	Environmental Public Info Officer for Septic Pumpout Program	56	CBLAD / King William County	Contact: Jeff Haughney Phone: 804.693.4040 \$15,000
	Bay Act Ordinance Development	57	CBLAD / Lancaster County	Contact: Dennis Carney Phone: 804.769.4933 \$21,219
			Contact: Pat Frere	Phone: 804.462.5220
SAMP 94	Dragon Run Watershed Mgmt Program Phase II	58	CBLAD / Middle Peninsula PDC	\$21,000
			Contact: Jim Uzel	Phone: 804.758.2311
CTA 6	Environmental Enforcement Specialist- Year II	59	CBLAD / Middlesex County	\$18,500
			Contact: Nick Hahn	Phone: 804.758.3382
PA 54	King-Lincoln Park Beach Replenishment	60	Newport News	\$24,000
			Contact: Kristine Hall	Phone: 804.247.0761
<input checked="" type="checkbox"/>	Environmental Enforcement & Tracking Database	61	CBLAD / Norfolk	\$54,378
			Contact: Lee Rosenberg	Phone: 804.644.4373
CTA 6	Wetlands Engineer- Year II	62	CBLAD / Northern Neck PDC	\$16,419
			Contact: Stuart McKenzie	Phone: 804.529.7400
PA 59	Potomac River Public Access Plan	63	Northern Virginia PDC	\$40,000
			Contact: Doug Pickford	Phone: 703.642.0700
PA 58	Mayo Island Public Access Plan	64	Richmond (City)	\$15,000
			Contact: Ray Sutton	Phone: 804.760.5695
PA 53	West Neck Creek Canoe Access & Nature Trail	65	Virginia Beach	\$44,833
			Contact: Clay Bernick	Phone: 757.427.4621899
EM 18	Regional Watershed Management Program	67	HRPDC	\$30,461
			Contact: John Carlock	Phone: 757.420.8300
PA 50	Cape Charles Public Beach Dune Crossovers for Public Access	68	Northampton County	\$25,000
			Contact: Tim Hayes	Phone: 757.331.1998
	Heritage Corridor	69	King William	\$40,000
			Contact: Dennis Carney	Phone: 804.769.4927
			<b>Subtotals</b>	<b>\$483,662</b>
			31.75% Local Share as a % of \$2,117,000 (Total 306/306A Award)	

SECTION 308 PROJECTS: Total Federal Award \$113,000				
	Title	Task	Grantee	Federal \$
PE 76	CZM/NERRS Workshops (2)	71	DEQ/VIMS	\$3,000
			Contact: David Niebuhr	Phone: 804.684.7144
SGM 113	Activated Carbon BMP Demonstration	72	City of Portsmouth	\$49,932
			Contact: Sid Kitterman	Phone: 804.393.8592
	Puraflo Sewage Treatment Demo Project	73	Middle Peninsula PDC	\$29,994
			Contact: Dan Kavanagh	Phone: 804.758.2311
SGM 113	Urban Filter Strip Demo Project	74	Newport News	\$13,000
			Contact: Kristine Hall	Phone: 757.247.7934
	Wetland Restoration and Public Education	76	Cape Charles	\$5,100
			Contact: Billy Mills	Phone: 804.769.0841
HW 32	Sighting Patterns of Coastal Migratory Dolphins in the near shore Waters of Virginia and North Carolina	77	Virginia Beach (Virginia Marine Science Museum)	\$11,974
			Contact: Mark Swingle	Phone: 757.437.4949

SECTION 6217 Projects: Total Federal Award \$200,000				
	Title	Task	Grantee	Federal \$
WQ 97	Coastal NPS Pollution Mgmt. Program	81	DCR: Soil & Water	\$137,463
			Contact: Rick Hill	Phone: 804.786.7119
CBPA 105	Chemical Monitoring Potomac Creek	82	CBLAD	\$20,645
			Contact: Scott Crafton	Phone: 804.225.3440
WQ 98	Assessing Marina Water Quality BMPs	83	VMRC	\$41,892
			Contact: Tony Watkinson	Phone: 757.247.2200

SECTION 309 PROJECTS: Total Federal Award \$228,000				
	Title	Task	Grantee	Federal \$
	Dredge Fishing Impacts on Eastern Shore	91	VMRC	\$50,000
			Contact: Mark Luckenbach	Phone: 757.787.5816
SAMP 87	Northampton Special Area Mgmt. Plan	92	DEQ/Subcontracts	\$148,000
			Contact: Tim Hayes	Phone: 757.331.1998
SAMP 87	SAMP Coordination	92.1	Northampton Co.	\$68,500
			Contact: Tim Hayes	Phone: 757.331.1998
SAMP 87	Economic Data and Strategy	92.3	Subcontract	\$79,500

SAMP 90

Bird Habitat Policy

Phone: 804.786.7951/804.367.8364

92.4

Contact: Tim Hayes

DCR/DGIF

Contact: Laura McKay

Phone: 757.331.1998

\$30,000

Phone: 804.698.4323

GRAND TOTAL

\$2,658,000

(306/306A/6217/309/308)

**Virginia Coastal Resources Management Program**  
**1995 Revised Project List**  
**Federal Coastal Zone Management Funds**  
**10th Year Implementation**

revised 12/31/97

☒ Project in Progress at Time of Publication  
and/or will be summarized in next catalogue

Total Federal Award (306/306A/6217/309/308) \$2,694,000  
Total Match (306/306A/308/6217) \$1,583,312

**SECTION 306/306A PROJECTS: Total Federal Award \$2,150,000**

Summary Pg.	Title	Task	Grantee	Federal \$
	Coastal Program Coordination	1	DEQ Contact: Laura McKay	\$147,306 Phone: 804.698.4323
	Public Info/Education/Special Projects	2	DEQ Contact: Laura McKay	\$1,571 Phone: 804.698.4323
	Environmental Education	2.1	DEQ Contact: Ann Regn	\$33,924 Phone: 804.698.4442
	Public Information	2.2	DEQ Contact: Bill Hayden	\$33,979 Phone: 804.698.4447
SAMP 90	1996 Eastern Shore Birding Festival	2.3	Northampton County Contact: Tim Hayes	\$10,000 Phone: 757.331.1998
HW 29	Avian Migration at Kiptopeke State Park	2.4	Northampton County Contact: Bill Williams (KESTREL)	\$8,286 Phone: 804.253.6779
	Interpretive Signage for Natural Areas	2.5	DCR Contact: Larry Smith	\$11,300 Phone: 804.786.7951
WQ 103	Tyler's Beach Sanitation Units	2.6	Isle of Wight Contact: Mary Ann Welton	\$880 Phone: 757.365.6316
PE 72	Constructed Wetlands Conference	2.7	Henricopolis SWCD Contact: Terry Ruhlén	\$3,000 Phone: 804.672.5176
PE 64	Chesapeake Bay Youth Conservation Corps Environmental Projects	2.8	City of Chesapeake Contact: Bill Cuthrell	\$6,445 Phone: 757.382.8184
PE 65	Tidewater Low County Almanac for the Northern Neck	2.9	Northern Neck PDC Contact: Vonnie Reynolds	\$4,115 Phone: 804.529.7400
PE 70	Bayscapes Brochure Reprinting	2.10	Alliance for the Chesapeake Bay Contact: Sarah Richardson	\$5,000 Phone: 804.775.0951
	Marine Mammal Stranding Data Analysis	2.11	VMSM Contact: Mark Swingle/Susan Barco	\$4,900 Phone: 757.437.4949
	Dragon Run Water Quality Monitoring	2.12	MPPDC Contact: Jim Uzel	\$1,000 Phone: 804.758.2311
	North Landing River Wetlands Assessment	2.13	DCR-NH Contact: Larry Smith	\$10,000 Phone: 804.371.6205
	Open Space Inventory	2.14	DCR Contact: John Davy	\$8,000 Phone: 804.786.1119
	Zoar State Forest Exhibits	2.15	VDOF Contact: Billy Mills	\$8,500 Phone: 804.769.0841
	Native Plants for Riparian Forest Buffers	2.16	DCR-NH Contact: Kevin Heffernan	\$12,687 Phone: 804.786.7951
	Southeastern Virginia Ecotourism Symposium	2.17	VA Beach Convention & Visitors Bureau Contact: James Wheeler	\$4,500 Phone: 757.437.4923
CTA 3	EIR/Federal Consistency	3	DEQ Contact: Tom Felvey	\$97,100 Phone: 804.698.3416
	Chesapeake Bay Program Coordination	4	DEQ Contact: Collin Powers	\$52,550 Phone: 804.698.4324
	Coastal Mapping Services	5	DEQ Contact: Scott Crafton	[\$75,000] Phone: 804.225.3440
match only	Support for Chesapeake Bay Commission	6	DEQ Contact: Laura McKay	\$0 Phone: 804.698.4323
	Coastal Land Acquisition at Winter Harbor, Mathews County	7	DCR Contact: Larry Smith	\$200,000 Phone: 804.786.7951
CTA 3	Bay Act Local Assistance Planners	8	CBLAD Contact: Scott Kudlas	\$74,000 Phone: 804.225.3440
CBPA 105	Biological Monitoring of Polecat Creek	9	CBLAD Contact: Scott Crafton	\$17,000 Phone: 804.225.3440
EM 16	Mapping Distribution & Abundance of SAV in the Chesapeake Bay & Tributaries	10	VIMS Contact: Robert Orth	\$28,000 Phone: 804.684.7332
SM 82	Littoral Sediment Suspensions in York River	11	VIMS Contact: John Boon	\$44,800 Phone: 804.684.7272
PE 72	Tidal Wetlands Permit Advisory Support	12	VIMS Contact: Carl Hershner	\$14,000 Phone: 804.684.7387
CTA 4	Permit Compliance: Inspection Staff and Permit Tracking System	13	VMRC Contact: Tony Watkinson	\$114,500 Phone: 757.247.2255
CBPA 105	Polecat Creek Land Use/Land Cover GIS	14	CBLAD Contact: Darryl Glover	\$34,000 Phone: 804.225.3440
	Protection & Fire Management for North Landing River Wetlands	15	DCR - CNH Contact: Larry Smith	\$52,149 Phone: 804.371.6205

EM 12	Natural Heritage Resource Maps, Info/Planning Support for CZM Localities	16	DCR-DNH	\$17,588
	Chesapeake Bay Characterization Report: Ecological Trends 1984-1994	17	DEQ	\$50,000
	On-Line Fish and Wildlife Information Access and Mapping	18	OGIF	\$10,790
	Field-Testing of Disease Resistant Eastern Oyster in Chesapeake Bay	19	VCU/DEQ/VMRC	\$22,496
HW 24	Intertidal Oyster Reefs: Settlement & Survival	20	VIMS/VMRC	\$18,517
	Water Quality Model for Shallow Tributary Waters	21	VIMS	\$48,147
	Freshwater Wetland Models	22	VIMS	\$45,322
HW 25	Shellfish Habitat Restoration through Remediation of Nonpoint Fecal Coliform	23	VPI&SU	\$56,191
<input checked="" type="checkbox"/>	Environmentally Sensitive Economic Development Plans	24	DED/MPPDC/NNPDC	\$89,910
	Oyster Enhancement in Great Wicomico River	25	VIMS	\$13,000
	Marine Mammal Interaction Reporting Compliance Enhancement	26	VMRC	\$33,000
	Revegetation of Coastal Spoils in Swash Bay	27	Virginia Commonwealth University	\$27,000
			Contact: George Simmons	Phone: 540.231.6407
			Contact: Neal Barber	Phone: 804.758.2311
			Contact: Roger Mann	Phone: 804.684.7000
			Contact: David Bower	Phone: 757.247.2238
			Contact: Donald Young	Phone: 804.828.1562
			Subtotals	\$1,473,353
			##### State Share as a % of \$2,150,000 (Total 306/306A Award)	

#### Local Tasks

##### Planning District Commission Tasks

Title	Task	Grantee	Federal \$
CTA 5, LGP 43	Technical Assistance	31 NVPDC	\$20,000
		Contact: David Bulova	Phone: 703.642.0700
CTA 5	Technical Assistance	32 RADCO	\$20,000
		Contact: Sandra Rives	Phone: 703.373.2890
CTA 5	Technical Assistance	33 NNPDC	\$20,000
		Contact: Stuart McKenzie	Phone: 804.529.7400
CTA 5	Technical Assistance	34 RRPDC	\$20,000
		Contact: Larry McCarty	Phone: 804.358.3684
CTA 5, LGP 43	Technical Assistance	35 Crater PDC	\$20,000
		Contact: Victor Liu	Phone: 804.861.1666
CTA 5	Technical Assistance	36 MPPDC	\$20,000
		Contact: Jim Uzel	Phone: 804.758.2311
CTA 5	Technical Assistance	37 HRPDC	\$40,000
		Contact: John Carlock	Phone: 757.420.8300
CTA 5	Technical Assistance	38 A-NPDC	\$27,500
		Contact: Jim McGowan	Phone: 757.787.2936
		Subtotals	\$187,500

#### Local Competitive Tasks

Title	Task	Grantee	Federal \$
CBPA 108	Bay Act Ordinances for Eastern Shore Towns	51 A-NPDC	\$30,000
		Contact: Paige Mayo	Phone: 804.757.2936
	Eastern Shore Groundwater Quality/Quantity GIS	52 A-NPDC	\$30,000
		Contact: Jim McGowan	Phone: 757.787.2936
PE 65	Tidewater Low Country Almanac - Eastern Shore	53 A-NPDC	\$13,500
		Contact: Jim McGowan	Phone: 757.787.2936
LGP 41	Coastal Resource Revisions to Comprehensive Plan	54 Accomack County	\$25,007
		Contact: Sandy Manter	Phone: 757.787.5726
	Land Use Plan Update	55 Charles City County	\$30,447
		Contact: Bill Britton	Phone: 804.829.9217
LGP 45	CBPA Comprehensive Plan Consistency Issues	56 City of Richmond	\$3,900
		Contact: Heather Mackey	Phone: 804.780.6313
CTA 6	Wetlands Engineer	57 Essex, King & Queen, King William	\$25,657
		Contact: Brian Wagner	Phone: 804.443.4951
	Hampton Roads Tributary Strategies	58 HRPDC	\$41,500
		Contact: John Carlock	Phone: 757.420.8300
SAMP 93	Southern Watershed Mgmt Plan - Phase II	59 HRPDC	\$15,500
		Contact: John Carlock	Phone: 757.420.8300
CTA 6	Environmental Planner	60 Lancaster County	\$18,747
		Contact: Pat Frere	Phone: 804.462.5220
CTA 6	Environmental Enforcement Specialist	61 Middlesex County	\$19,543
		Contact: Charles Culley	Phone: 804.758.4330
SAMP 94	Dragon Run Watershed Management Program	62 MPPDC	\$20,740
		Contact: Jim Uzel	Phone: 804.758.2311
CTA 6	Wetlands Engineer	63 NNPDC	\$15,934

		<b>Contact: Josie Wold</b>		<b>Phone: 804.529.7400</b>
<input checked="" type="checkbox"/>	Eco-industrial Park Habitat Restoration	64	Northampton County	\$60,000
			<b>Contact: Tim Hayes</b>	<b>Phone: 757.331.1998</b>
	NPS Reduction Using Four Mile Run H2O Quality Model	65	NVPDC	\$16,696
			<b>Contact: Donald Waye</b>	<b>Phone: 703.642.0700</b>
	Habitat Restoration in Chickahominy Watershed	66	RRPDC/ACB	\$44,976
			<b>Contact: Larry McCarty</b>	<b>Phone: 804.358.3684</b>
	Bay Watershed Habitat & Restoration Plan & Demo	67	Virginia Beach	\$17,500
			<b>Contact: Clay Bernick</b>	<b>Phone: 757.427.4621</b>
	New Point Comfort Observation Area & Habitat Restoration	68	Mathews County	\$25,000
			<b>Contact: Trent Funkhouser</b>	<b>Phone: 804.725.4034</b>
	Landscape Assessment	69	King & Queen County	\$14,500
			<b>Contact: George Hayfield</b>	<b>Phone: 804.769.0928</b>
	King William County Park Best Management Practices, Phase I	70	King William County	\$20,000
			<b>Contact: Dennis Carney</b>	<b>Phone: 804.769.4933</b>
<b>Subtotals</b>				<b>\$489,147</b>
##### Local Share as a % of \$2,150,000 (Total 306/306A Award)				

<b>SECTION 308 PROJECTS: Total Federal Award \$66,000</b>				
	<b>Title</b>	<b>Task</b>	<b>Grantee</b>	<b>Federal \$</b>
PE 76	CZM/NERRS Workshops	71	DEQ/VIMS	\$1,000
			<b>Contact: David Niebuhr</b>	<b>Phone: 804.684.7144</b>
WQ 104	Precision Farming & Nutrient Reduction in the Coastal Zone	72	VPI&SU	\$43,460
			<b>Contact: Saied Mostaghimi</b>	<b>Phone: 540.231.7605</b>
	Riparian Reforestation Demonstration	73	DEQ Contractual	\$21,540
			<b>Contact: William Reay</b>	<b>Phone: 804.642.7119</b>
				<b>\$66,000</b>

<b>SECTION 6217 PROJECTS: Total Federal Award \$250,000</b>				
	<b>Title</b>	<b>Task</b>	<b>Grantee</b>	<b>Federal \$</b>
WQ 97	Coastal NPS Pollution Management Program	81	DCR- Soil & Water	\$166,853
			<b>Contact: Rick Hill</b>	<b>Phone: 804.786.7119</b>
CBPA 105	Chemical Monitoring Polecat Creek	82	CBLAD	\$18,630
			<b>Contact: Scott Crafton</b>	<b>Phone: 804.225.3440</b>
WQ 97	Response to 6217 Program Review	83	DEQ/DCR	\$0
			<b>Contact: Laura McKay</b>	<b>Phone: 804.698.4323</b>
	Calibration/Verification of Small Coastal Basin Modeling	84	VIMS	\$25,000
			<b>Contact: Al Kuo</b> <b>Phone: 804.684.7212 (DEQ: Arthur Butt 804.698.4314)</b>	
HW 25	Shetfish & Water Column Fecal Conform Fingerprinting	85	VPSI	\$15,000
			<b>Contact: George Simmons</b>	<b>Phone: 540.231.6407</b>
	Sediment Contamination Assessments	86	Old Dominion University	\$24,517
			<b>Contact: Raymond Alden III</b>	<b>Phone: 757.683.4195</b>
				<b>\$250,000</b>

<b>SECTION 309 PROJECTS: Total Federal Award \$228,000</b>				
	<b>Title</b>	<b>Task</b>	<b>Grantee</b>	<b>Federal \$</b>
SAMP 87	Northampton Special Area Management Plan	92	DEQ/Subcontracts	(See 92.1 & 92.2)
			<b>Contact: Tim Hayes</b>	<b>Phone: 757.331.1998</b>
SAMP 87	SAMP Coordination	92.1	Northampton Co.	\$108,147
			<b>Contact: Tim Hayes</b>	<b>Phone: 757.331.1998</b>
SAMP 87	Economic Implementation Strategy	92.3	Subcontract	\$119,853
			<b>Contact: Tim Hayes</b>	<b>Phone: 757.331.1998</b>

**TOTAL 309** **\$228,000**

**GRAND TOTAL** **\$2,694,000**  
**(306/306A/6217/309/308)**



**Virginia Coastal Resources Management Program**  
**1996 Revised Project List**  
**Federal Coastal Zone Management Funds**  
11th Year Implementation

Revised 12/31/97

Total Federal Award (306/306A/309) \$2,627,000  
Total Match (306, 306A, 309) \$2,258,000

☒ Project in Progress at Time of Publication  
and/or will be summarized in next catalogue

**SECTION 306/306A PROJECTS: Total Federal Award \$2,258,000**

Summary Page:		State Tasks		
	Title	Task	Grantee	Federal \$
	Coastal Program Administration	1	DEQ	\$209,050
	Public Info/Ed/Special Projects	2	DEQ	\$1,856
	<input checked="" type="checkbox"/> Environmental Education	2.1	DEQ	\$38,200
	Public Information	2.2	DEQ	\$32,200
	Master Interpretive Plan for Historic Resources Exhibit	2.3	DHR	\$5,000
	Curation of Yorktown Shipwreck Underwater Collection	2.4	DHR	\$5,000
CTA 3	EIR and Federal Consistency	3	DEQ	\$110,000
	Chesapeake Bay Program Coordination & Tributary Strategies Development	4	DEQ	\$122,283
	VIMS - Shallow Water Quality in Tributaries Phase II	4.1	VIMS	\$42,200
	VIMS - Freshwater Wetland Models Phase II	4.2	VIMS	\$39,970
cancelled	BNR Retrofit Study - Eleven Plants	4.3	DEQ	\$0
	Calibration of Tidal Water Prism Water Quality Model for Small Coastal Basins	4.4	VIMS	\$30,000
	Mapping Services for Localities	5	CBLAD	\$50,000
CTA 3	Local Planning Assistance	6	CBLAD	\$65,000
CBPA 105	Potomac Creek Projects: Chemical/Biological Monitoring & Land Use GIS	7	CBLAD	\$66,652
	Coastal Nonpoint Source Pollution/Tributary Strategies Program	8	DCR	\$81,635
	Fire Management for North Landing River Wetlands Restoration	9	DCR	\$57,000
	Belle Isle and Hog Island Riparian Reforestation	10	DCR	\$18,750
EM 12	Natural Heritage Liaison - Resource Mapping & Habitat Restoration	11	DCR	\$32,500
match only	Support for Chesapeake Bay Commission	12	DLS	\$0
	Difficult Run Riparian Reforestation	13	DOF	\$31,220
	Field Testing of Disease-Resistant Oysters	14	VCU	\$22,027
	SAV Mapping	15	VIMS	\$45,628
PE 72	Tidal Wetlands Technical Support	16	VIMS	\$14,000
	Rappahannock Riparian Reforestation Protocol	17	VIMS	\$17,870
	Marine Mammal/ Sea Turtle Stranding Network	18	VIMS/MSM	\$30,000
CTA 14	Permit Compliance and GIS	19	VMRC	\$175,000
	Mitigation Banking Guidelines	20	VMRC/VIMS	\$36,793
	Coastal Riparian Buffer Plantings and Workshops	21	VPI&SU	\$130,730
	Integrated Pest Management Implementation on Commercial Turf in HRPDC	22	VPI&SU	\$20,000

Contact: Edward Overton Phone: 804.566.1367

Subtotals \$1,560,564  
69.80% State Share as a % of \$2,258,000 (Total 306/306A Award)

#### Local Tasks

##### Planning District Commission Tasks

Title	Task	Grantee	Federal \$
<input checked="" type="checkbox"/> Technical Assistance	31	NVPDC Contact: David Bulova Phone: 703.642.0700	\$20,000
Technical Assistance	32	RADCO Contact: Sandra Rives Phone: 540.373.2890	\$20,000
Technical Assistance	33	NNPDC Contact: Stuart McKenzie Phone: 804.529.7400	\$20,000
Technical Assistance	34	RRPDC Contact: Larry McCarty Phone: 804.358.3684	\$20,000
Technical Assistance	35	Crater PDC Contact: Victor Liu Phone: 804.861.1666	\$20,000
Technical Assistance	36	MPPDC Contact: Jim Uzel Phone: 804.758.2311	\$20,000
Technical Assistance	37	HRPDC Contact: John Carlock Phone: 757.420.8300	\$40,000
Technical Assistance	38	A-NPDC Contact: Jim McGowan Phone: 757.787.2936	\$20,000
Subtotals			\$180,000

#### Local Competitive Tasks

Title	Task	Grantee	Federal \$
Eastern Shore Town Bay Act Assistance	51	AN PDC Contact: Paige Mayo Phone: 804.787.2936	\$30,000
PE 64 Habitat Restoration by Youth Conservation Corps	52	Chesapeake Contact: Bill Cuthriell Phone: 757.382.8185	\$28,499
CTA 6 Wetlands Engineer	53	Essx/Kg & Qn/Kg Wm Contact: Brian Wagner Phone: 804.443.4951	\$20,000
Tributary Strategies - Phase II	54	HR PDC Contact: John Carlock Phone: 757.420.8300	\$44,578
Regional Waterway/Vessel Management Plan	55	HR PDC Contact: John Carlock Phone: 757.420.8300	\$26,500
CTA 6 Northern Neck Regional Wetlands Engineer	56	Lancaster Contact: Josie Wold Phone: 804.462.5220	\$18,280
Great Wicomico Watershed Plan	57	Lancaster Contact: Pat Frere Phone: 804.462.5220	\$15,000
CTA 6 Environmental Enforcement Specialist	58	Middlesex Contact: Charles Culley Phone: 804.758.4330	\$15,500
Nutrient Reduction Strategies	59	MP PDC Contact: Jim Uzel Phone: 804.758.2311	\$27,680
Regional Plan-Environmentally-Compatible Business Development	60	MP/NN PDC Contact: Neal Barber Phone: 804.758.2311	\$90,000
White House Cove Pier Restoration	61	Poquoson Contact: Sherry Earley Phone: 804.868.3535	\$63,649
Tributary Strategies	62	RADCO Contact: Sandra Rives Phone: 703.373.2890	\$30,000
Bryan Park Reforestation	63	Richmond Contact: Stephen Kane Phone: 804.780.4322	\$35,000
Riparian Reforestation in the Chickahominy Watershed	64	RR PDC Contact: Larry McCarty Phone: 804.358.5386	\$52,750
Habitat Restorations in the Ches Bay Watershed	65	VA Beach Contact: Clay Bernick Phone: 757.247.4621	\$20,000
Subtotals			\$517,436

30.20% Local Share as a % of \$2,258,000 (Total 306/306A Award)

#### SECTION 309 PROJECTS: Total Federal Award \$369,000

Title	Task	Grantee	Federal \$
Update Section 309 Needs Assessment and Strategy	91	DEQ Contact: Laura McKay Phone: 804.698.4323	\$38,241
SAMP 87 Special Area Management Plan for Sustainable Development	92	Northampton Contact: Tim Hayes Phone: 757.331.1998	\$190,000
HW 29 Monitoring Avian Migration at Kiptopeke State Park	92.1	KESTREL Contact: Bill Williams (KESTREL) Phone: 804.253.6779	\$11,965
SAMP 93 Special Area Management Plan for Southern Watershed	93	Virginia Beach/ Chesapeake Contact: John Carlock Phone: 757.420.8300	\$105,000
Aquaculture Management Initiative	94	VMRC Contact: Tony Watkinson Phone: 757.247.2255	\$23,794

GRAND TOTAL \$2,627,000  
(306/306A/309)



